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Conrad W. Cook

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THE  
COLLECTED WORKS  
OF  
SIR HUMPHRY DAVY, BART.







THE  
COLLECTED WORKS  
OF  
SIR HUMPHRY DAVY, BART.  
LL.D. F.R.S.

FOREIGN ASSOCIATE OF THE INSTITUTE OF FRANCE, ETC.

EDITED BY HIS BROTHER,  
JOHN DAVY, M.D. F.R.S.

VOL. I.  
MEMOIRS OF HIS LIFE.

LONDON:  
SMITH, ELDER AND CO. CORNHILL.  
1839.





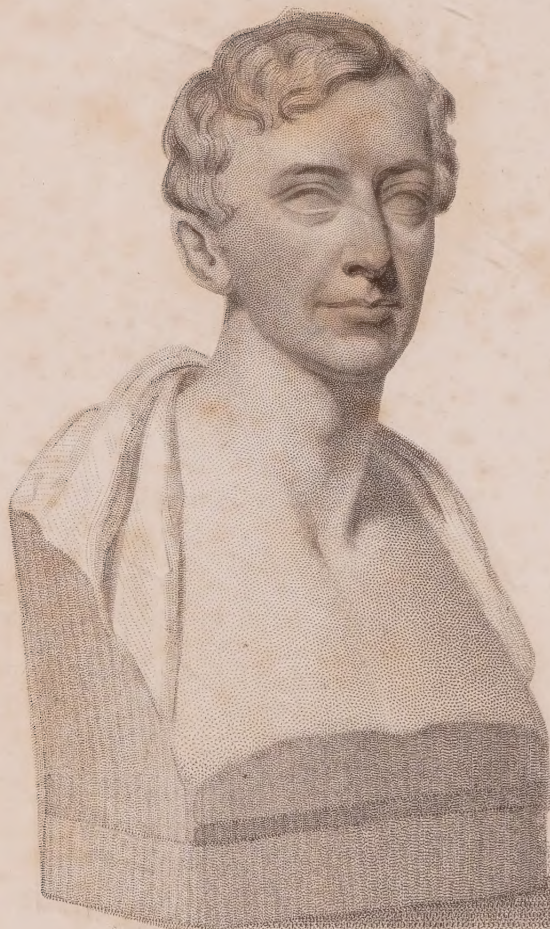
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SIR HUMPHRY DAVY, BART.

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# MEMOIRS

OF

THE LIFE OF

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“Vita enim mortuorum in memoria vivorum est posita.”—Cic. *Philip.* ix.

“The affections are their own justification. The Light of Love in our hearts, is a satisfactory evidence that there is a body of warmth in the minds of our friends or kindred, whence that Light has proceeded.”—WORDSWORTH, *Essay upon Epitaphs.*

# CONTENTS.

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## CHAPTER I.

Particulars of his infancy and early youth, of his school education—  
Studies after leaving school—Extracts from his earliest note-books—  
Portions of his early poetry—The course of his studies further illustrated by extracts—Anecdotes of this period of his life, relating to his habits, feelings, and pursuits—His application to chemistry, first entered on as a branch of medical studies—Rapid advance—Appointed Superintendent of the Pneumatic Institution ..... PAGE 1

## CHAPTER II.

Letter to his mother on quitting home—Advantages of his situation at Clifton—Character of Dr. Beddoes—Of Mr. Poole—Notices of his researches, in connexion with his philosophical opinions—Extracts from his note-books, illustrative of the same—First visit home—Lines on the occasion—Further extracts from note-books, showing his varied pursuits, and modes of sentiment and thought—Fragments of a poem—Happy life and aspirations—Letters expressive of these—Accepts an appointment in the Royal Institution—List of his publications whilst at Clifton ..... PAGE 45

## CHAPTER III.

His reception as a Lecturer at the Royal Institution—Circumstances favouring his success—His manner as a Lecturer—As an Experimenter—His Habits at this time, and manner of living—Notice of his principal Scientific Labours and Discoveries between 1801 and 1807—Dangerous Illness in 1807—Lines written after his Recovery—Farther Notice of his Labours and Discoveries, from 1807 to 1812—Circumstances of his Personal History—His Marriage in 1812, and Relinquishment of the Professorship of Chemistry at the Royal Institution—Extracts from his Note-Book in Verse and Prose, whilst at the Institution ..... PAGE 87



## CHAPTER IV.

Habits after his marriage, and devotion to science—His first visit to the Continent—His researches on Iodine—Brief characters of some of his Contemporaries—Verses written in travelling—His scientific labours in Italy—Extracts from his Journal in the Tyrol in 1814 and 1815—Anecdote from Sir Walter Scott—Return to England—Researches on Fire-damp, and discovery of a Safety Lamp—Public dinner at Newcastle, and acknowledgments in 1817—Extracts from his note-books on various subjects, philosophical, political, religious—His second visit to the Continent—His journal of an excursion into the Tyrol—Verses written at the Baths of Lucca—Notice of further scientific labours abroad and at home..... PAGE 158

## CHAPTER V.

Death of Sir Joseph Banks in 1820, whom he succeeds as President of the Royal Society—Particulars of him in connection with this office—Observations on it—Notices of his continued scientific labours; especially on magnetism and the liquefaction of the gases—Verses on Lord Byron—Researches on the corrosion and on the protection of the copper sheathing of vessels—Journal of an excursion in Norway and Sweden in 1824—His declining health in 1825—Specimens of his poetry at that time—His last election as president of the Royal Society..... PAGE 264

## CHAPTER VI.

Experiences a paralytic attack—Third visit to Italy through France—Particulars of him whilst at Ravenna—Verses written there—Extracts from his note-books and journals relative to his occupations, feelings, and course of travel—His return to England and visit to Mr. Poole—Salmonia, or Days of Fly-fishing—Notice of him as an angler—His last journey into Italy—Extracts from his journals with letters relative to this time—Paralytic seizure at Rome; account of this illness—Particulars of his journey to Geneva, and of his death—Notice of his last work, his "Consolations in Travel"—Particulars of his person, disposition, and habits—Letters illustrative of his feelings—Portraits of him—Estimates of his character by Mr. Andrew Knight, Dr. Henry, Mr. Poole, and an American—Concluding Remarks..... PAGE 324

# MEMOIRS OF

## THE LIFE OF

### SIR HUMPHRY DAVY.

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#### CHAPTER I.

Particulars of his infancy and early youth, of his school education—Studies after leaving school—Extracts from his earliest note-books—Portions of his early poetry—The course of his studies further illustrated by extracts—Anecdotes of this period of his life, relating to his habits, feelings, and pursuits—His application to chemistry, first entered on as a branch of medical studies—Rapid advance—Appointed Superintendent of the Pneumatic Institution.

THE most important part of the history of a man of science is necessarily recorded in his works. This feeling, strongly entertained, has induced me to engage in the present undertaking, of giving to the world as complete an edition as possible of all my brother's writings.

Something more, however, is required to satisfy that laudable curiosity which has created Biography. In a former publication I attempted to pourtray his life in various detail, both as a man and as a philo-



sopher, and to clear from aspersion his fair fame,—“the good name,” which is “the proper inheritance of the deceased.”\* In the present Memoir, whilst endeavouring to administer to the curiosity alluded to, I shall carefully abstain from all that is controversial and vindictory,—trusting that what was before a duty, is now superfluous.

Sir Humphry Davy was the eldest son of Robert and Grace Davy. His native place was Penzance, on the shore of the Mount's Bay in Cornwall. He was born on the 17th of December, 1778, at five o'clock in the morning, as is certified in the cover of a large family-bible, in the handwriting of his father. He was christened on the 22nd of January of the following year, and was nursed by his mother. He was a healthy, strong, and active child, and in every respect forward. It is remembered that he walked off (to use a nursery phrase) when he was just nine months old; and I have been told that before he was two years old he could speak fluently. Being an only child when he was born, in the midst of many fond relations and kind friends, he was a great favourite, and was made much of,—a circumstance, no doubt, which greatly conduced to the development of his infant faculties. Before he had learned his letters, he could recite little prayers and stories, which had been repeated to him till he had got them by heart; and before he had learned to write, he amused himself with copying the figures in *Æsop's Fables*, which, with “*Pilgrim's Progress*,” were his first favourite books; and under his drawings in great letters he contrived to give them their names. His memory was very retentive; in proof of which it is handed down in his family, that when very young he could

\* Lord Bacon.

recite a great part of the book last mentioned, even before he could well read it. I believe that, like Pope, he “lisped in numbers.” I remember hearing my mother say, that when scarcely five years old he made rhymes, and recited them in the Christmas gambols, attired in some fanciful dress prepared for the occasion by a playful girl who was related to him. His disposition as a child was remarkably sweet and affectionate.

The first school he was sent to was that of a Mr. Bushell, at which reading and writing only were taught. This master, then an old man, remarking the rapid progress of his young pupil, in a very disinterested manner recommended the removing him (he was then six years old) to the grammar-school. This school was kept by the Rev. Mr. Coryton, a man of irregular habits, and ill-fitted for the office of teaching youth, and as deficient in good method as in sound scholarship. He was generally careless, indiscriminating, and indulgent in regard to the manner in which the boys performed their exercises; but occasionally severe, acting the tyrant, and punishing heavily slight offences. Pulling the boys’ ears was practised by him in the most capricious manner, and my brother was too frequently a sufferer from this infliction. It is recorded of him that, on one occasion, he appeared before Mr. Coryton with a large plaster on each ear, and that, when asked by his master what was the matter with his ears, he replied, with a grave face, that he had “put the plasters on to prevent a mortification.” It is curious to see how, in after-life, he reflected on the apparent disadvantages and evils of this school, and supposed that good had accrued to him from them. In a letter to his mother, written in 1802, towards the close of it, making



inquiries respecting me, who a short time before had been sent to school at Helston, he asks, "Does John like Latin and his school, now the novelty of the first impression is passed away? I recollect I was rejoiced when I first went to Truro school, but I was much more rejoiced when I left it for ever. Learning naturally is a true pleasure: how unfortunate then it is that in most schools it is made a pain? Yet Dr. Cardew comparatively was a most excellent master.\* I wish John may have as good a one. After all, the way in which we are taught Latin and Greek does not much influence the important structure of our minds. I consider it fortunate that I was left much to myself when a child, and put upon no particular plan of study, and that I enjoyed much idleness at Mr. Coryton's school. I perhaps owe to these circumstances the little talents that I have, and their peculiar application. What I am I have made myself; I say this without vanity, and in pure simplicity of heart!" and that it really was so said, is evident from the manner in which it is written at the end of the letter, when he had filled his paper with other matters, and was obliged to write it round the margin.

During the early part of his life, to which he thus refers the formation of the bias of his character, he was more distinguished out of school and by his comrades

\* The Rev. Dr. Cardew, for many years Master of the Truro Grammar School, was generally esteemed and estimated, as mentioned above. His school produced more men of distinguished ability than any other in the West of England. The expenses attending it were eighteen pounds a-year for board, and four pounds for teaching! Such was the moderation of the time, and place. This information I had from a gentleman who was himself educated there, and who, commenting on its cheapness, added, "the education received there was that of a gentleman."

than for any great advance in learning. Within school the stimulus was wanting to exertion. He appears to have taken the lead in his class, and to have been satisfied; or rather, as may be inferred from what has been mentioned, disgusted, with the uninviting form in which classical knowledge was offered to him, and the repulsive circumstances accompanying it. From his facility in composing Latin and English verse, his assistance was often requested, even by boys much older than himself, in these exercises; and in writing valentines and love-letters he shone so pre-eminently, and gave his aid so willingly, that he is said to have been generally resorted to on all emergencies of boyish loves. Another cause of popularity amongst his comrades was his power of diverting by telling them stories; and so attractive were the stories, commonly of wonder and terror, which he related, that they were in the habit, in an evening, of collecting at a particular place to wait for him, as under the balcony of the Star Inn,\* which afforded shelter, and where, if there happened to be a cart, he would get into it and hold forth to his young audience. His stories, greatly embellished by his invention, were collected partly from books, especially the "Arabian Nights," of which he was ever very fond, and partly from old people, with whom he was a great favourite, particularly from his grandmother Davy;—a woman of a fervid and poetical mind, of a retentive memory, and who had at command a rich store of traditions and marvels. His other boyish tastes and pursuits, like the preceding, followed him into manhood. Fishing was very early a favourite amusement

\* The inn, which is still standing, was nearly opposite to the house in which he was born, in Market Jew Street, the first street on entering Penzance from the eastward.



of his; indeed, his taste for it appears to have been almost instinctive. When a child he used, with a crooked pin tied to a stick by a bit of thread, to go through the movements of the angler, and fish in the gutter of the street in which he lived. The earliest indication that I am aware of, which he showed of his fondness for experimenting, for which he was afterwards so distinguished, was in making fire-works. My eldest sister very well remembers, that she was his assistant in this undertaking, and that their workshop was an unfurnished room, in which, in bad weather, the Rev. Dr. Tonkin (the elder brother of Mr. John Tonkin, his early benefactor\*), then advanced in age, and a valetudinarian, took exercise on his chamber-horse, a large arm-chair attached to spring boards, which boards served for a table for compounding the ingredients of the squibs and crackers.

The circumstances of his boyish days were equally favourable to health and the formation of active habits, and to the fostering of that love of nature which never forsook him through life, and was an unfailing source of solace and delight to him even in pain and sickness. He took up his abode with Mr. John Tonkin when he was nine years of age, on the occasion of his family leaving Penzance to reside at Varfell, which is situated on the shore of the Mount's Bay, separated from the sea by an intervening marsh, and immediately opposite the most striking and beautiful feature in the Bay, that from which it derives its name, St. Michael's Mount—†

\* This gentleman died in 1801, at the advanced age of eighty-two;—the friend of my mother and her sisters, who were left orphans in infancy,—he supplied the place of a father to them;—and from regard to her, in a manner, adopted her son.

† In an early unfinished poem is the following description of St. Mi-

“Where the great Vision of the guarded Mount  
Looks toward Namancos and Bayona’s hold.”

This romantic and poetical object, whether he was at Penzance or at Varfell, was almost constantly in view; and in the frequent visits which he made to his home, he saw much that could not fail to impress his susceptible mind. The country between Varfell and Penzance, a distance of about two miles and a half, is an exquisite specimen of Cornish scenery: the expanse of the ever-varying blue sea on one side, bounded only by the horizon, and the distant headlands; on the other

Michael’s Mount, in connexion with its traditionary history;—according to which, anterior to a sudden invasion of the sea, which overwhelmed a great extent of country, “The Mount” was in the midst of a forest,—in accordance with which its Cornish name signifies a vinnewed rock in the wood:—

“By the orient gleam

Whitening the foam of the blue wave, that breaks  
Around his granite feet, but dimly seen,  
Majestic Michael rises: He whose brow  
Is crowned with castles, and whose rocky sides  
Are clad with dusky ivy: He whose base,  
Beat by the storms of agés, stands unmoved  
Amidst the wreck of things,—the change of time.  
That base, encircled by the azure waves,  
Was once with verdure clad; the low’ring oaks  
There waved their branches green,—the sacred oaks  
Whose awful shades among the Druids stray’d  
To cut the hallowed miseltoe, and hold  
High converse with their Gods.

On yon rough craig

Where the wild tamarisk whistles to the sea blast,  
The Druid’s harp was heard, swept by the breeze  
To softest music, or to grander tones  
Awakened by the awful master’s hand.  
Those tones shall sound no more. The rushing waves  
Raised from the vast Atlantic have o’erwhelmed  
The sacred groves; and deep the Druids lie  
In the dark mist-clad sea of former time.”



side, furze-clad hills, and rocky little glens, each pouring down its small clear stream, diversified with green fields, farm-houses, orchards, and other accompaniments of cultivation.\* These little journeys to and fro were made on horseback, on a favourite

\* The following poetical lines, written by the Rev. Mr. Le Grice, were intended to be inscribed on a pile of rocks known by the name of Gulval-Carne, situated in one of the most beautiful of the little valleys above alluded to, and which was a favourite haunt of my brother's in early life, and where, after his death, it was proposed to erect a monument to his memory :—

*Inscription for the Rocks at Gulval.*

These rocks were once the sportive hour's retreat  
Of Davy's boyhood. Here his youthful gaze  
Fix'd in rapt musing on the shores, the sea,  
And on the "fabled Mount," which lifts its tower  
Crowning the waters.—Loved, but not indulged,  
The dreams of Fancy fled: for strong awoke  
Those inborn sympathies, which bade him woo  
Philosophy, a helpmate to explore  
The depths of Nature, and with chemic skill  
To trace the secret powers which mould her forms.

Of human knowledge to enlarge the bounds,  
To win new empire for the mind of man,  
Ev'n in thy chambers,<sup>1</sup> Death—to him was given.  
How few achieve such triumphs! whose rewards,  
Unlike the trophies raised by other toils,  
By Time are cherish'd, and by Time increased.<sup>2</sup>  
Preserve his name, ye rocks: and on your brow,  
As with a mother's fond, and fost'ring hand,  
Let Nature still her mossy garlands wreath:<sup>3</sup>  
A monument, beyond man's utmost art  
To rear; fit object of his tend'rest care  
To guard, and save.

C. V. L. G.

Nov. 9, 1831.

<sup>1</sup> By his Safety Lamp.

<sup>2</sup> See his own thoughts in his Consolations.

<sup>3</sup> Nec ingenium violarent marmora tophum."—*Juv. Sat.* 3. 20.

See the whole passage.

pony, called Derby; and, when he was able to wield a fishing-rod, or carry a gun, he roamed at large in quest of sport over the whole of the adjoining district,—a region admirably adapted to invite curiosity and affect the imagination, — whether we look to its natural scenery, its antiquities, its venerable Druidical remains, or its great works of mining art. Under the same favourable circumstances, a taste for natural history early appeared in him: he had a little garden of his own, which he kept in order, and he was fond of collecting and painting birds and fishes.\*

In mentioning these circumstances and incidents of his young life, I would not wish to be considered as attaching much importance to them. Thousands of

\* The following extract is from a letter with which I have been favoured by a relation, Mr. Nicholls,—who has so honourably distinguished himself as the poor man's friend, in the capacity of a Poor Law Commissioner :—" I can never forget," he writes, " that as boys we knew and loved each other. I recollect," he proceeds, " a visit he paid in company with his aunt at my father's, who then resided at Lanarth. He was a great favourite; but there was even then an original mode of thinking and acting observable in him,—one instance of which I well remember; —it was on rather a hot day, when my father, mother, your aunt, Humphry, and myself, were to walk to a place a mile or two distant, I forget for what purpose. Whilst others complained of the heat, and whilst I unbuttoned my waistcoat, Humphry appeared with his great-coat close buttoned up to his chin, for the purpose, as he declared, of keeping *out* the heat. This was laughed at at the time, but it struck me then, as it appears to me now, as evincing originality of thought and an indisposition to be led by the example of others."

Mr. Nicholls adds, " I remember him, too, during a visit I paid to him at Penzance. He was then fond of drawing, and painted likenesses and landscapes, badly enough of course, but still there seemed always an independence of will and action about him, pointing him out as not of the common herd of boys;—and I well recollect that he was so spoken of and regarded by those who had the best opportunities of knowing him. I have a vague recollection of Mr. Tonkin, in whose house Humphry seemed to be absolute, and who appeared very much attached to him."



individuals have been born and brought up amidst similar scenes, and in a manner very little different from him, without being gifted with any unusual abilities; and very many boys have shown indications of precocious talent, superior to his, which has withered in the bud or flower. There belonged, however, to his mind,

cannot be doubted, the genuine quality of genius, or of that power of intellect which exalts its possessor above the crowd, and which, by its own energies and native vigour, grows and expands, and comes to maturity, aided, indeed, and modified by circumstances, but in no wise created by them. We look back on the infancy of the man of genius with a curious and inquisitive eye, and easily discover presages in the actions of the child of the deeds of the man,—actions which, at the moment, attracted little attention, and seemed to be without import, and which owe their interest solely to the future; and thus I believe it was in my brother's case.

He was thought at the time a clever boy, but not a prodigy; and no anticipation was then formed of the high career he was so soon to enter upon, and of the proud distinctions he was about to earn. This very clearly appears from a letter of his last master, Dr. Cardew, to whose school he was removed when he was fourteen years old, on the 15th of January, 1793. Dr. Cardew's words are,—“While he was under my care, he gave me much satisfaction, being always regular in the performance of his duties as a school-boy, and in his general conduct. He was, too, I believe, much liked by his school-fellows for his good humour; but he did not at that time discover any extraordinary abilities, or, so far as I could observe, any propensity to those scientific pursuits which raised him to such eminence. His best

exercises were translations from the classics into English verse.”\*

His quitting Dr. Cardew’s school was an important era in his life; he left it in December, 1793, and then, at the early age of fifteen, his school education was considered as completed, and his self-education, to which he owed almost every thing, was about to commence.

Immediately on his return to Penzance, he took up his abode with his kind friend, Mr. John Tonkin, by whom he had been, in a manner, adopted, and who defrayed his expenses during the twelve months that he was at Truro. The greater part of the following year he was, I believe, in an unsettled state, studying in a desultory manner, by fits and starts, and yielding to the allurements of occasional dissipation, and the amusements which constitute the delight of active youth, as fishing, shooting, swimming, and solitary

\* I have been favoured with a specimen of his early composition in prose (the earliest remaining), written when he was with Dr. Cardew, and inserted in the school album, which is still in existence. It appears as a fragment; and is on Gratitude in connection with the Supreme Being:—

“ Our Creator should be the first object of gratitude, which is due to him for all his mercies. We should admire, love, and praise him. Indeed, we can never make sufficient return for his goodness: the least thing we can do is to be grateful; yet we seldom consider him as the dispenser of the blessings we enjoy; we rather attribute it to ourselves. Yet if he were to withdraw the least of his favours, we should think him unjust. Man seldom or never thinks himself obliged to his Maker; he makes a god of his own desires, and adores them instead of the Deity. We should think ourselves obliged to a person who snatched us from impending danger, or relieved us from distress: how much more grateful ought we to be to him who protects us every day from imminent danger, and desires nothing for his goodness but gratitude and praise? A grateful heart is more acceptable to the Lord than a multitude of sacrifices.”—*H. Davy.*

rambles. This, perhaps, was the most dangerous period of his life, and in conversation with me he has so spoken of it. Amusement, for a time, threatened to obtain the mastery, and keep him down to the common level. But his good genius triumphed; and, after a few months' vacillation, he applied himself in earnest to the cultivation of his mind, and to the acquisition of knowledge; and the flame, once kindled, burnt ever after, till it expired in death. His exact course of study, after leaving school, I have not been able to ascertain, except that he commenced by taking lessons in French with a Mr. Dugart, a refugee, who resided at Penzance; nor have I been able to learn if any peculiar circumstances influenced him, besides the workings of his own mind and an aspiration after better things, to relinquish all his idle and boyish habits. About this period his father's health was declining; and in December of that year (1794) he died. This event probably had a powerful effect in giving steadfastness to his resolution; and, I am quite certain, that the circumstances of his family became with him an additional and powerful motive to exertion. Another circumstance, which immediately followed, might have aided the impression of the last: I allude to the choice of a profession.

In the beginning of the following year, namely, on the 10th of February, 1795 (the date of his indenture), he was apprenticed to Mr. Bingham Borlase, a man of talent, then practising as surgeon and apothecary in Penzance, who afterwards received a diploma, and was distinguished as a physician.

His note-books, commenced about this time, which have been preserved, and which are now before me, show the ardour with which he entered upon his studies, and the extensive reach of his mind in the



various branches of knowledge which he proposed to pursue.

The earliest of them, bearing the date of this year, is, on many accounts, a literary curiosity. It is a small quarto, with parchment covers: on one of the covers, on the outside, is the figure of an ancient lyre, drawn with his pen, and, on the other, an olive wreath encircling a lamp; as if in anticipation of his great discovery of confining flame in the safety lamp. At the commencement of it is the following plan of study, which I shall transcribe verbatim:—

- |  |   |
|--|---|
| 1. Theology.                                       |   |
| Or Religion,                                       | }     { taught by Nature.<br>{ by Revelation. |
| Ethics, or moral virtues }                         |   |
| 2. Geography                                       |   |
| 3. My Profession.                                  | 5. Language.                                  |
| 1. Botany.   | 1. English.                                   |
| 2. Pharmacy.                                       | 2. French.                                    |
| 3. Nosology.                                       | 3. Latin.                                     |
| 4. Anatomy.  | 4. Greek.                                     |
| 5. Surgery.  | 5. Italian.                                   |
| 6. Chemistry.                                      | 6. Spanish.                                   |
| 4. Logic.  | 7. Hebrew.                                    |
| 6. Physics.  |   |
| 1. The doctrines and properties of natural bodies. |   |
| 2. Of the operations of nature.                    |   |
| 3. Of the doctrines of fluids.                     |   |
| 4. Of the properties of organised matter.          |   |
| 5. Of the organisation of matter.                  |   |
| 6. Simple Astronomy.                               |   |
| 7. Mechanics.                                      | 9. History and Chronology.                    |
| 8. Rhetoric and Oratory.                           | 10. Mathematics.                              |

To give some distinct idea of the bent of his studies at this time, I shall notice briefly the principal topics which appear in this MS. volume. It opens with "Hints towards the Investigation of Truth in Religious and Political Opinions, composed as they occurred, to be

placed in a more regular manner hereafter." His first essay is "On the Immortality and Immateriality of the Soul;" the second bears the title of "Body, organised Matter;" and his third is "On Governments." Then there follows:—"On the credulity of Mortals;" next, "An Essay to prove that the Thinking Powers depend on the Organisation of the Body;" next, "A Defence of Materialism;" next, "An Essay on the ultimate End of Being;" next, "On Happiness;" then "On Moral Obligation." These topics occupy rather more than one-half of the book; the other part, which appears to have been written after, commences at the opposite end, inverted. The subjects treated of occur in the following order:—"Theology;" "The Christian Religion not repugnant to true Philosophy;" "An Essay on the Influence of Climate on national Manners and Happiness;" "On Friendship, an Essay;" and besides these, which are the principal contents of the book, there are some verses, and the beginning of a romance, called "*An Idyl*," in prose, in the form of dialogue; the characters, "Trevelis, a warrior, and friend of Prince Arthur, and Morrobin, a Druid;" the scene, "a cliff at the Land's End, in Cornwall; and the time, night."

This mere enumeration of topics strongly marks the early bias of his mind; and the manner in which he treated the subjects was very characteristic; first, I would say, of that period of his life, and next, of himself. This I shall illustrate by some extracts. Even the partial display of the workings of such a mind may be interesting, and not without advantage to others. He starts in his career of inquiry devoting himself to unprejudiced reason, which is to be his sole guide. With all the daring confidence of youth, he enters upon the most difficult problems in metaphysics and theology,

and employing a syllogistic method of reasoning, in somewhat of a mathematical form (which, as he observes in his "Consolations in Travel," young men commonly follow in entering upon such inquiries), he arrives, as might be expected, at conclusions contrary to the good feelings and common sense of mankind. It will suffice to give an example of the argument from which he deduces inferences in favour of materialism. He says, "If we trace the progress of the thinking powers from their original source, we shall find that they owe their being to perception. A child, when it first comes into the world, is without ideas, and, consequently, he does not think. All the actions he performs arise from instinct. When hunger calls him, he satisfies his cravings with the milk of his mother; nor does he at all differ from the most stupid animal, only in being more helpless. He possesses but a small degree of perception; his attention is awakened with difficulty; the memory is weak and faint; and the ideas, without being often repeated, are not retained. As the child advances in years, the nerves become firmer and the brain stronger; perception is quicker, and the memory is more tenacious and retentive. Judgment, the result of perception and memory, is displayed: by degrees reason as slowly advances; and, lastly, disposition, the boundary of human intelligence, appears. Gradual is the progress of mind from sense to science. When the mental faculties have reached their highest perfection in manhood, they gradually decline; and nought is left of all the wreck of human knowledge but pure sensation, a principle gradually decaying with the falling frame. From hence there follows a self-evident corollary, that the thinking powers are not always the same: whatsoever is not always the same is naturally changeable, is mortal and



material. Besides, we have traced the power of thinking from 0 to 0, increasing with the corporeal powers, and decreasing and ending with them."

In this cold region of materialism, which was altogether uncongenial to a mind like his, he remained a very short time. The same reasoning power which entangled him in the difficulty, when more exercised and strengthened, freed him from the thralldom. Intent on truth, he always had a wonderful facility in relinquishing an opinion, and this in metaphysical inquiries as well as in the pursuits of science; and thus, by not being too much "devoted to consistency" (to use an expression of his own), he was able to advance in the line of discovery. There are before me now observations of his in this note-book, written, apparently, after looking over his former sentiments, and comparing them with those which he entertained at the moment. At the bottom of a portion of his first essay, in which he considers the reasons for and against the immateriality of the soul, he has written, "These observations were written at sixteen years and a half: what a revolution in my opinions since that time, now nineteen years and a half!"

In the same note-book, under the head of "The Christian Religion not repugnant to true Philosophy," he writes, "A very short time since, I should have considered nothing more unlikely than my defending religion."

I shall now insert some passages from the same note-book, illustrative of this change of sentiment from materialism, and probably scepticism, if not irreligion, to a rational religious belief founded on immaterialism. I shall first give the heads of a train of argument in favour of the latter doctrine.

“ 1. The power of thinking does not naturally belong to matter.

“ 2. Motion, if ever so artfully distributed, it is plain, can produce nothing but motion.

“ 3. Matter acts only in proportion as it moves; thinking is acting without motion; *ergo*, that which thinks is not matter.

“ 4. The universality of the hypothesis.

“ 5. Internal consciousness of the existence of a monadic indivisible soul.”

I shall next give some extracts, conveying his views on religion, which, though contained in this note-book, were probably formed a year or two later.

#### “ THEOLOGY.

“ All religion arises from a belief in a Supreme Being, the maker of, and the directing cause that governs, the universe. To prove, then, the necessity of religion, it will be first of all necessary to prove the existence of such a Being. Things must have been in their present situation, either from the agency of such a Being, or from chance.

“ 1. From the consideration of final causes, there arise a thousand arguments to prove the being of a God.

“ 2. Then, if matter is naturally inanimate, motionless, and disorganised, it would have ever continued so, without some cause to set it in motion.

“ 3. If every part of matter had been naturally inclined to motion, the world would have been a universe of dancing atoms, without regularity.

“ One or other of these it must have been; chance could have had no influence either in one or the other.

“ Or supposing it had an influence on the last, it

could never have produced regular systems, formed according to the nicest rules of geometry; it could never have produced organised systems capable of thinking.

“If chance could not have made the world what it is, and as matter is naturally motionless, it necessarily follows, that there must have been some cause which set it in motion, powerful, active, and intelligent. This cause having endowed particular masses of matter with particular properties,—having made them active, intelligent, and powerful, and having given them means to increase their powers and happiness by many extraordinary benefits and advantages not common to being in general,—it follows that they ought to adore, and be thankful to him for these properties, which is the foundation of natural religion.”

A little further on are sketched the heads of an Essay, bearing the title of, “The Christian Religion not repugnant to true Philosophy.”

“1. Introduction. Of the Nature of Evidence.

Distinction between Faith and Knowledge.

“2. Nature of the Evidence for Christianity.

“3. Christianity consistent with Theism.

Deism the Religion of Jesus Christ.

“4. The Necessity of Revelation proved.

“5. The Difficulty of gaining the Knowledge of the Unity of the Godhead without Revelation.

“6. The God of the Bible, and the Morality of the Bible, consonant with Reason and Nature.

“7. Objections answered.”

I cannot find that he completed or continued this essay; nor have I been able to find anything on the subject of religion in any other of his early note-books, excepting in one, which, from the handwriting, it may



be inferred, was in use about the same time as the preceding, and which contains "A Letter on the pretended Inspiration of the Quakers and other Sectaries." In it are many forcible remarks on the subject of illusions in matters of religion, and on the influence of enthusiasm and superstition, "passions," he justly observes, "which, though seemingly opposite, are often found in the same person, and domineer over the mind alternately." After showing the tendency of the human mind to error from its very nature, and to deceive itself and others, mistaking the illusions of fancy for realities, and the hallucinations of a distempered intellect for heavenly inspirations; and after pointing out the usefulness of "a moderate degree of rational scepticism," as a guard against these sources of error, he concludes with observing, that "the simple and fundamental truths of the Christian religion are perfectly intelligible; viz., the unity of God; the necessity of morality; and the future state of retribution founded on the resurrection." And these, he adds, "should be made the basis of our faith, for they will bear the test of reason, and stand firm and immutable amidst the eternal revolutions of opinions."

It is interesting to compare these his early inquiries on the subject of religion with those he engaged in at a later period, as expressed in his "Salmonia," and "Consolations in Travel." We may trace in the former the germs of many of the latter; and, indeed, the resemblance is often so marked, that the trains of thought have very much the character of recollections; with this marked difference, however, that in youth he considered reason as all-sufficient, whilst in later life he mistrusted it, as inadequate, and built his faith on internal or instinctive feeling, rather than on any pro-

cess of ratiocination. And, I may here further remark, that, in comparing the two periods of his life, in relation to this inquiry, it is instructive to witness how presumptuous and daring is youthful genius; how easily satisfied with the semblance of truth; how modesty, distrust, and humility increase with the acquisition of knowledge; and how, with the conviction of the very limited extent of human knowledge, religious hope and faith also increase.

For the purpose of illustrating, as fully as is in my power, the other studies which he engaged in at this time, and his modes of thinking and feeling, I shall not hesitate to make further extracts from his note-books, which are the more interesting and worthy of credit, as they were intended solely for his own use, and contain, it may be said, the spontaneous effusions of his mind, "written in rough," as he expressly states. I shall limit these references, in this place, to the period of about three years and a half, at the expiration of which he left Penzance for Bristol.

During the first year, that is, 1795, from the contents of his earliest note-books already given, it would appear that his studies, though miscellaneous, were chiefly metaphysical, connected with religion; and that neither his profession, nor any branch of physical science, had yet become the subject of decided preference. This is well shown in his essay "On the Influence of Climate on National Manners and Character." It is ingeniously written, and displays very considerable reading, and much discrimination, but not a proportional knowledge in matters of science, and especially of chemical science. Indeed, there is a remark in it, which pretty clearly indicates, that when he wrote it, he was ignorant of the merest rudiments of chemistry; for, speaking of the

climate of Egypt, he attributes the coolness of the nights there “to the great quantity of nitre with which the air is impregnated.”

The “Essay on Friendship,” which follows that on climate in the note-book, marks also the nature of his miscellaneous studies. It is chiefly deserving of notice, however, as it displays the generous sentiments which he entertained at this period on the subject of friendship, and which he retained and cherished throughout life. I shall make a quotation from it, without hesitation, on account of its length, believing that it will excite a sympathy in every ingenuous mind.

“Friendship,” he says, “derives all its beauty and strength from the qualities of the heart, or from virtuous or lovely dispositions; or, should these be wanting, some shadow of them must be present: it can never dwell long in a bad heart or mean disposition. It is a passion limited to the nobler part of the species, for it can never co-exist with vice or dissimulation. Without virtue, or the supposition of it, friendship is only a mercenary league, or a tie of interest, which must of course dissolve when that interest decays, or subsists no longer.

“It is a composition of the noblest passions of the mind: a just taste and love of virtue, good sense, a thorough candour and benignity of heart, and a generous sympathy of sentiment and affections, are the essential ingredients of this nobler passion. When it originates from love and esteem, is strengthened by habit, and mellowed by time, it yields infinite pleasure, ever new and ever growing. It is the best support amongst the numerous trials and vicissitudes of life; and gives a relish to most of our enjoyments. What can be imagined more comfortable than to have a friend to



console us in afflictions, to advise with in doubtful cases, and share our felicity? What firmer anchor is there for the mind, tossed like a vessel on the tumultuous waves of contingencies, than this? It exalts our nobler passions, and weakens our evil inclinations; it assists us to run the race of virtue with a steady and undeviating course. From loving, esteeming, and endeavouring to felicitate particular people, a more general passion will arise for the whole of mankind. Confined to the society of a few, we look upon them as the representatives of the many, and from friendship, learn to cultivate philanthropy."

He finishes this essay with an allegory, intended to illustrate the influence of friendship, "in its tenderest form, between the sexes" (his own words), and how much their happiness depends upon mutual love and esteem. The Almighty is described, after the creation of man, as deliberating with the guardian angels of his throne, on the propriety of creating woman. Justice, Peace, and Virtue, personified in these angels, plead against her creation, on the ground of the vice and misery she is likely to bring on her companion, who, on her account, will be "driven from Paradise, and happiness, and joy, to labour in pain and misery on the barren earth."

They are met by intercessors, by Mercy and Religion, who plead in her favour, and by Divine Love:—"The Omnipotent hesitated; when his first-born child, the divine Love, stood before him; her countenance covered with smiles ineffably pleasing. 'Create her,' she cried, 'for Paradise itself will afford no delight to man without woman. She will be the cause of his misery, but she will likewise be the cause of all his happiness. She will console him in affliction; she will com-

fort and harmonise his soul; she will wipe the tears from his eyes, and compose the fury of his passions. Her friendship shall make him virtuous, and her love shall make him happy; and, lastly, the tree of their transgression, and the plant of immortality, nourished by the blood of her son, shall flourish, and grow out of Paradise, and overspread the earth: man shall eat of their fruit, and be immortal and happy."

The same note-book contains other proofs, that, whilst his judgment and reasoning powers were unfolding, his imagination was kindled; and, what is very unusual in youth, his fancy was not depressed by the severer faculties, but merely guided, sustained, and strengthened. Knowledge, in fact, was the food of his imagination, and, even his earliest poetry displays a strong tincture of philosophy, and not less of a love of nature; indeed, these two, a philosophical spirit, and an intense love of nature, happily blended in his poetical writings, impart to them a peculiar character, and give them their principal charm. And all the allusions to nature, even at this early period, as well as at a later, betoken the strong impression of the actual scenery before his eyes, and express the great features of the scenes surrounding him. In confirmation, I shall insert here one of his earliest poems entire, which was first published in the "Annual Anthology" of 1799, with the date of 1795, when it was probably conceived, and perhaps written in part, though I believe it was not completed till a year or two after.

#### THE SONS OF GENIUS.

" Bright bursting through the awful veil of night  
The lunar beams upon the ocean play ;  
The watery billows shine with trembling light,  
Where the swift breezes skim along the sea.

The glimmering stars in yon ethereal plain  
Grow pale, and fade before the lurid beams,  
Save where fair Venus, shining o'er the main,  
Conspicuous still with fainter radiance gleams.

Clear as the azure firmament above,  
Save where the white cloud floats upon the breeze ;  
All tranquil is the bosom of the grove,  
Save where the zephyr warbles through the trees.

Now the poor shepherd wandering to his home,  
Surveys the darkening scene with fearful eye,—  
On every green sees little elfins roam,  
And haggard sprites along the moonbeams fly.

While superstition rules the vulgar soul,  
Forbids the energies of man to rise,  
Raised far above her low, her mean control,  
Aspiring genius seeks her native skies.

She loves the silent, solitary hours ;  
She loves the stillness of the starry night,  
When o'er the bright'ning view Selene pours  
The soft effulgence of her pensive light.

'Tis then, disturb'd not by the glare of day,  
To mild tranquillity alone resign'd,  
Reason extends her animating sway  
O'er the calm empire of the peaceful mind.

Before her lucid, all-enlightening ray,  
The pallid spectres of the night retire ;  
She drives the gloomy terrors far away,  
And fills the bosom with celestial fire.

Inspired by her, the sons of genius rise  
Above all earthly thoughts, all vulgar care ;  
Wealth, power, and grandeur, they alike despise,—  
Enraptured by the good, the great, the fair.

A thousand varying joys to them belong,—  
The charms of nature and her changeful scenes :  
Theirs is the music of the vernal song,  
And theirs the colours of the vernal plains.



Theirs is the purple-tinged evening ray,  
With all the radiance of the evening sky ;  
Theirs is the splendour of the risen day,  
Enshrined in glory by the sun's bright eye.

For them the zephyr fans the odorous dale ;  
For them the warbling streamlet softly flows ;  
For them the Dryads shade the verdant vale ;  
For them sweet Philomel attunes her woes.

To them no wakeful moonbeam shines in vain  
On the dark bosom of the trackless wood ;  
Sheds its mild radiance o'er the desert plain,  
Or softly glides along the crystal flood.

Yet not alone delight the soft and fair,  
Alike the grander scenes of nature move ;  
Yet not alone her beauties claim their care,  
The great, sublime, and terrible they love.

The sons of nature,—they alike delight  
In the rough precipice's broken steep ;  
In the bleak terrors of the stormy night ;  
And in the thunders of the threatening deep.

When the red lightnings through the ether fly,  
And the white foaming billows lash the shores ;  
When to the rattling thunders of the sky  
The angry demon of the waters roars ;

And when, untouch'd by Nature's living fires,  
No native rapture fills the drowsy soul ;  
Then former ages, with their tuneful lyres,  
Can bid the fury of the passions fall.

By the blue taper's melancholy light,  
Whilst all around the midnight torrents pour,  
And awful glooms beset the face of night,  
They wear the silent, solitary hour.

Ah ! then how sweet to pass the night away  
In silent converse with the Grecian page,  
Whilst Homer tunes his ever-living lay,  
Or reason listens to the Athenian sage.

To scan the laws of Nature, to explore  
 The tranquil reign of mild Philosophy ;  
 Or on Newtonian wings sublime to soar  
 Through the bright regions of the starry sky.

Ah ! who can paint what raptures fill the soul  
 When Attic freedom rises to the war,  
 Bids the loud thunders of the battle roll,  
 And drives the tyrant trembling from her shore ?

From these pursuits the sons of genius scan  
 The end of their creation,—hence they know  
 The fair, sublime, immortal hopes of man,  
 From whence alone undying pleasures flow.

By science calmed, over the peaceful soul,  
 Bright with eternal Wisdom's lucid ray,  
 Peace, meek of eye, extends her soft control,  
 And drives the puny Passions far away.

Virtue, the daughter of the skies supreme,  
 Directs their life, informs their glowing lays ;  
 A steady friend, her animating beam,  
 Sheds its soft lustre o'er their latter days.

When life's warm fountains feel the frost of time,  
 When the cold dews of darkness close their eyes,  
 She shows the parting soul upraised, sublime,  
 The brighter glories of her kindred skies.

Thus the pale moon, whose pure celestial light  
 Has chased the gloomy clouds of heaven away,  
 Rests her white cheek, with silver radiance bright,  
 On the soft bosom of the western sea.

Lost in the glowing wave, her radiance dies ;  
 Yet, while she sinks, she points her lingering ray  
 To the bright azure of the orient skies,  
 To the fair dawning of the glorious day.

Like the tumultuous billows of the sea  
 Succeed the generations of mankind ;  
 Some in oblivious silence pass away,  
 And leave no vestige of their lives behind.

Others, like those proud waves which beat the shore,  
A loud and momentary murmur raise ;  
But soon their transient glories are no more,  
No future ages echo with their praise.

Like yon proud rock, amidst the sea of time,  
Superior, scorning all the billow's rage,  
The living sons of genius stand sublime,  
The immortal children of another age.

For those exist whose pure ethereal minds,  
Imbibing portions of celestial day,  
Scorn all terrestrial cares, all mean designs,  
As bright-eyed eagles scorn the lunar ray.

Theirs is the glory of a lasting name,  
The meed of genius, and her living fire ;  
Theirs is the laurel of eternal fame,  
And theirs the sweetness of the muse's lyre."

From the same source of information, his note-books, it appears that in the beginning of the following year, namely, 1796, he entered on the study of the mathematics. One book is almost entirely confined to this subject ; and in it, his progress may be traced through the following branches, which he enumerates under the head of "Mathematical Rudiments;" viz., "Fractions, vulgar and decimal; Extraction of Roots; Algebra (as far as quadratic equations), Euclid's Elements of Geometry; Trigonometry; Logarithms; Lines and Tangents; Tables; Application of Algebra to Geometry," &c. He entered upon Fractions, February 8th, 1796; and he appears to have finished the elementary course which he assigned himself in little more than twelve months, for the last date is January 2, 1797, when he was commencing the eleventh book of Euclid, and he had gone through most of the other branches.

In this study he was very systematic; the propo-



sitions are all entered very neatly, and the demonstrations given; the diagrams are invariably done with a pen, without the aid of mathematical instruments, not even of a common compass and ruler, except in one or two instances. This circumstance of itself would show that he engaged in these studies without a master, which was the fact, and perfectly voluntarily on his part, from the conviction of their usefulness preliminary to the study of physical and chemical science.

His favourite pursuit and exercise of mind this year and the following, as also during the preceding, was metaphysics, on which he has left very copious notes. These rough notes display much thought, and some original thought, and an acquaintance with the writings of all the more distinguished metaphysicians of modern times, as Locke, Hartley, Bishop Berkeley, Hume, Helvetius, Condorcet, Reid, and his followers, who are designated by the general title of the Scotch metaphysicians; and he appears to have had some acquaintance with the doctrines of Kant and the Transcendentalists. Even now he thought for himself, and seems to have been free from the undue influence of authority. When he mentions distinguished names, it is not in the way of simple assent to their opinions, but critically, and often in terms of dissent. Thus, on the subject of ideas, he admits, with Locke, that what are commonly called innate ideas are words without meaning; but he does not admit that the mind of the new-born child is a *tabula rasa*; he contends that, even in the womb, it may have acquired ideas of touch and of hearing, and that, even before birth, thought may have been exercised. In illustration of his modes of thinking at this time, I shall give a few passages which occur in his note-book detached.

“Human life is nothing more than a succession of sensations, ideas, pleasures, and pains. Science or knowledge is the association of a number of ideas, with some idea or term capable of recalling them to the mind in a certain order.”

“By examining the phenomena of nature, a certain similarity of effects is discovered. The business of science is to discover these effects, and to refer them to some common cause; that is, to generalise ideas.”

“Far from being conscious of the existence of matter, we are only conscious of the active powers of some being.”

“By discovering the ratio between the attraction and repulsion of external things and our organs, we should discover philosophy.”

About this time, or perhaps a little later,—certainly whilst he was at Penzance,—he commenced a work, which he intended to have been of a comprehensive kind and considerable length, but which, like all his other exercises of mind at this period, was unfinished. It was called “Observations relating to Existence:” I shall notice briefly some parts of it. The first division of it was “On the Use of Words,” in which he points out the idols of language, and how the idolatry of words has infected all discussions as concerning space, identity, spirit, substance, matter, &c. He says, “The science of the human mind, or existence, is nothing more than the formation of an intelligible language, in which a simple history of the existence and arrangement of impressions, ideas, or feelings is communicated.” The second division is “On Innate Ideas,” to which I have already referred. Opposing the notion of the child being born with its mind blank, he remarks, “If a

child is capable of hearing external noises in the womb, he may, probably, have some collections of ideal terms in his mind before birth; they can, however, have no *accurate* meaning, but they may have meaning, because they may be associated with other ideas." When considering this subject, he observes, "What are called reasonings, moral truths, and self-evident propositions, are neither more nor less than collections of general terms standing for other terms, which themselves stand for ideas." The third division is "On Consciousness," and the fourth, "On the Arrangement of Beings," with which the fragment terminates as a connected dissertation.

His metaphysical studies were associated with some professional ones. Those of which he left any memoranda were chiefly theoretical, relating to physiology, in which he pursued a path similar to that he first followed in metaphysics and religion,—being a process of abstract reasoning founded on a few principles, or abstract terms, by which, like Hartley and Brown, he attempted to explain all the phenomena of life. But his illusion was of short duration; he very soon discovered the fallacy of the method, and ever after completely avoided it.

His passion for poetry appears to have kept pace with the expansion of his faculties, and not to have been damped even by application to the mathematics; but all his efforts in numbers this year were desultory, if I may judge from the remains of them, and confined principally to brief effusions, expressive of some particular sentiment or feeling. I shall give only one specimen, which was published in the "Annual Anthology" of 1799, with the date of 1796:—



## THE TEMPEST.\*

The Tempest has darken'd the face of the skies,  
The winds whistle wildly across the waste plain,  
The fiends of the whirlwind terrific arise,  
And mingle the clouds with the white foaming main.

All dark is the night and all gloomy the shore,  
Save when the red lightnings the æther divide ;  
Then follows the thunder with loud sounding roar,  
And echoes in concert the billowy tide.

But tho' now all is murky and shaded with gloom,  
Hope the soother soft whispers the tempest shall cease :  
Then Nature again in her beauty shall bloom,  
And enamour'd embrace the fair sweet-smiling Peace.

For the bright blushing morning, all rosy with light,  
Shall convey on her wings the Creator of day ;  
He shall drive all the tempest and terrors of night,  
And nature, enliven'd, again shall be gay.

Then the warblers of spring shall attune the soft lay,  
And again the bright flowret shall blush in the vale ;  
On the breast of the ocean the zephyr shall play,  
And the sunbeam shall sleep on the hill and the dale.

If the tempest of Nature so soon sink to rest ;  
If her once faded beauties so soon glow again ;  
Shall Man be for ever by tempest oppress'd,—  
By the tempest of passion, of sorrow, and pain ?

Ah, no ! for his passions and sorrows shall cease,  
When the troublesome fever of life shall be o'er :  
In the night of the grave he shall slumber in peace,  
And passion, and sorrow, shall vex him no more.

\* A manuscript copy of this little poem was found amongst the papers of the late Rev. Dr. Cardew, with a note in pencil, by Dr. Cardew, naming the author of it—a “ circumstance which would seem to indicate that he set some value on his pupil's production.”—This is the remark of the Rev. J. Hayden Cardew, in a letter with which he has favoured me.

And shall not this night, and its long dismal gloom,  
Like the night of the tempest again pass away?  
Yes! the dust of the earth in bright beauty shall bloom,  
And rise to the morning of heavenly day.

In the following year (1797) he appears to have commenced in earnest the study of natural philosophy. The bias of his former speculations followed him here, as his note-books show, in which there are some theoretical views and reasonings respecting impulse, and the communication of motion; and further on this subject, or on the collision of bodies, I suspect his inquiries did not extend. From some information given by his early friend and schoolfellow, the Rev. Dr. Batten, it has been imagined that he had made a series of experiments to investigate the laws of the collision of bodies, by means of elastic and inelastic balls. This I am disposed to consider unfounded: amongst his memoranda there is no allusion to any such experiments, nor did I ever hear him speak of them. He was fond of billiards, and for a short time after leaving school indulged in the game, as I have heard him mention, when speaking of that dangerous period of his life. At the billiard table, I would conjecture he collected the data, on which the speculations on collision were founded, with which he surprised his friend. Be this as it may, the pursuit of natural philosophy soon gave place to that of chemistry. He began the study of chemistry in November or December of the same year, when he was just entering on his nineteenth year. Several incidents, which will be mentioned hereafter, enable me to fix the time with precision. He appears to have entered on this study merely as a branch of his professional knowledge, and to have followed it at first chiefly theoretically. His early chemical

reading was confined to two works of a very different description, — “ Lavoisier’s Elements of Chemistry,” and “ Nicholson’s Dictionary of Chemistry,”—the one distinguished for its admirable logic, precision of reasoning, and boldness of speculation compared with any that had preceded it; the other an indifferent collection of facts and opinions, of various times and merit,—a kind of border tract between the old and new doctrines, and hardly worthy of the name of the author it bore. This new study seems very soon to have excited in his mind a most lively interest. He was not satisfied with merely reading, and acquiring the ideas of others; he criticised the theoretical views of the great French philosopher; doubted, rejected, and advanced speculations of his own. And speculation appears to have led him to experiment, and experiment to further speculation, with such rapid progress, that in a few months he formed a new hypothesis, and flattered himself that he had triumphed over an important part of the doctrine of the French school. Such was the commencement of his career of original research, which in a few years, by a succession of discoveries, accomplished more in relation to change of theory and extension of science, than in the most ardent and ambitious moment of youth he could either have hoped to effect, or could have imagined possible.

I could wish to dwell on his early chemical studies and pursuits, and relate all the circumstances of them minutely; but I regret to say that I have very little information to give respecting them. That the theoretical parts of chemistry first engaged his attention, will presently appear from his own words. Thus, in August 1799, he writes (I quote from his note-book), “ About twenty months ago, I began the study of chemistry.



The system of Lavoisier, almost the only elementary book in my possession, was the first that I studied." And in the same note-book, alluding to his early Essays, and the manner in which they were attacked by the Reviewers, he writes, "These critics, perhaps, do not understand, that these experiments were made when I had studied chemistry only four months,—when I had never seen a single experiment executed, and when all my information was derived from Nicholson's Chemistry and Lavoisier's Elements." It is, however, equally certain, both from his own statements, and from the recollection of his family, that he did not confine himself to speculation, and that he very soon entered on a course of experiments. His means, of course, were very limited; not more extensive than those with which Priestley and Scheele began their labours in the same fruitful field. His apparatus, I believe, consisted chiefly of phials, wine-glasses, and tea-cups, tobacco-pipes, and earthen crucibles; and his materials were chiefly the mineral acids and the alkalies, and some other articles which are in common use in medicine. He began his experimental trials in his bed-room in Mr. Tonkin's house, in which, as already stated, he was a favourite inmate.\* Here there was no fire, and when he required

\* This house has recently been pulled down;—its site is occupied by a part of the new market-house, the foundation-stone of which was laid in 1835, when Mr. Wm. Davy was mayor of Penzance. It is, perhaps, worthy of remark, that the spot selected for the performance of this ceremony was that on which stood a small room, often the scene of my brother's early experimental labours. Mr. Pearce, who addressed the mayor and corporation on the occasion, thus alluded to the circumstance. "The spot from which I now address you must ever be memorable. Here it was that the greatest philosopher of the age, your near relation (he was a first cousin) first devoted himself to that science which has rendered his name immortal. I knew him (Mr. Pearce adds) from my early childhood. I studied under him, and cannot but feel proud of the honour

it, he was obliged to come down to the kitchen with his crucible.

The experiments, I believe, which he first engaged in, were of a simple kind; as the preparing of the gases, trying the effects of acids and alkalies on vegetable colours; the solution and precipitation of metals; in brief, those required to illustrate the leading doctrines of the science, and to exhibit the most remarkable then known of its agents. But to these alone he did not long confine himself; very soon he originated new experiments, for the purpose of supporting his speculative views, or of ascertaining the truths of his opinions. The number, however, of these, I believe was not large; and I infer this from his own statements and from not being able to find in his note-books of the time any minutes of experiments,—only hypothetical views and arrangements.

The rapidity with which he advanced in his new pursuit is strongly indicated by the circumstance that, in the April following, in the short space of four months, he was in correspondence with Dr. Beddoes, relative to his researches on “Heat and Light,” and a new hypothesis on their nature, to which Dr. Beddoes became a convert. The results of these researches were the chief subject of his first publication, “Essays on Heat and Light,” &c., which appeared in 1799, and were in part written a few months after he had commenced the study of chemistry.

The very rapid advance I have described was, no doubt, principally owing to the enthusiasm with which he prosecuted the science, and applied to it all the

to which you and the council have called me to assist in laying the foundation-stone of such a building on this site.”

*The West Briton, July 15th, 1835.*

powers of his mind : but it was also favoured and promoted by circumstances. These I shall briefly notice, and one especially, which was his becoming acquainted with Mr. Gregory Watt. This gentleman came to Penzance in the winter of 1797, and remained there during the following spring ; and, fortunately for my brother, became a lodger in my mother's house, boarding with the family. He was then in his twenty-first or twenty-second year, as I have learned from his brother, Mr. James Watt. He had left the University of Glasgow a short time before ; his mind, enriched beyond his age with science and literature, and devoted to the acquisition of knowledge. In familiar intercourse with the family with whom he lived, he and my brother speedily became acquainted, and their acquaintance soon ripened into friendship of the warmest and most disinterested kind. They met daily ; explored the objects worthy of notice in the adjoining country ; visited the most remarkable mines, and, as my sister well remembers, generally returned from their walks with their pockets loaded with specimens of rocks and minerals. The Wherry mine, the shaft of which was in the sea, approached by a long wooden bridge, and the workings of which were entirely under the sea, at the short distance of about a mile from Penzance, was a favourite place of resort with them. It afforded an unusual variety of minerals,\* and, from its peculiarities, could not fail to excite a deep interest in their minds,

\* In a paper by my brother on the Geology of Cornwall, published in the first volume of the Transactions of the Royal Geological Society of Cornwall, this variety is called by him "extraordinary." He says, "I have seen in the refuse heaps, blende, oxide of uranium, oxide of titanium and of iron ; peach blende, nickel, and arsenical pyrites ; and in a single piece of the vein of a few inches square many of these substances might be found embedded in quartz or chlorite."—P. 42.



as a struggle of art against nature, in which a victory was gained over the elements by means of the most wonderful invention of the age,—the steam-engine,—which, only a short time before, had been perfected by the distinguished father, the elder Mr. Watt; and this very engine, erected on the shore, acting at a distance over the surface of the sea, and drawing up water from beneath its bed, was one of the earliest that had been introduced into Cornwall.\*

The precise advantages which my brother derived from these excursions and daily communings cannot be calculated. The information he obtained was doubtless one, but I suspect a very small one, in comparison with another: I mean the sympathy which the generous friendship of youth, so suitable to genius, is ever ready to yield, and the consciousness of intellectual power and resources, which must naturally result from the struggle of intellect.

Another favourable circumstance, though less to be insisted on, was the acquaintance which my brother about the same time formed with Mr. Davies Gilbert (afterwards his successor in the chair of the Royal Society), a man older than himself, with considerable knowledge of science generally, and with the advantages of a university education.

In considering the very rapid progress of my brother in chemical science, other circumstances, besides the acquaintance of these gentlemen, may be briefly noticed:

\* For a description of this remarkable mine, I may refer the reader to Mr. John Hawkins's paper on submarine mines, published in the same volume of the work last quoted. Mr. Hawkins remarks, that "the close of this mine was as romantic as its commencement. Its machinery was destroyed by a vessel which broke from its anchorage in the adjoining roadstead, and ran against it."—P. 142.

even the locality of his native town was favourable to it. The surrounding mines of copper and tin, abounding in a great variety of splendid and extraordinary minerals, worked to vast depths by means of the power of water and steam; the adjoining cliffs and headlands, composed of rocks, strikingly different, from the granite of the Land's End to the serpentine of the Lizard; and even the sea and air of that tempestuous and ever-changing climate, could hardly fail to rouse the curiosity of his active intellect, and to excite a strong desire to study the science which promises to explain the mysterious operations of nature.\* And, when he did begin the study of it, these sources yielded him subjects in abundance to experiment on, and bring into play his powers of research; even the weeds thrown up by waves on the sea-shore, or vegetating in the pools of salt water on the ebbing of the tide, afforded

\* The feelings which he experienced, associated with some of the impressive scenery in the neighbourhood of his native place, are happily described in one of his earliest poems, already alluded to, called "An unfinished poem on the Mount's Bay," especially in that part of it in which the "Land's End" is noticed, where "The great ocean mingles with the sky."

"Thy awful height, Bolerium, is not loved  
By busy man; and no one wanders there  
Save he who follows Nature; he who seeks  
Amidst thy craigs and storm-beat rocks to find  
The marks of changes, teaching the great laws  
That raised the globe from chaos; or, he whose soul  
Is warm with fire poetic,—he who feels  
When Nature smiles in beauty, or sublime  
Rises in majesty: he who can stand  
Unawed upon thy summit clad in tempests,  
And view with raptured mind the roaring deep  
Rise o'er thy foam-clad base, while the black cloud  
Bursts with the fire of heaven."

matter for interesting inquiries, and were, indeed, one of the first objects, if not the very first, to which he applied himself in the way of original research.

Moreover, the state of the science at that time was very favourable to his rapid advances in it: a new theory of chemistry, the antiphlogistic, only a few years before had been brought forward, and was hardly yet fully established; pneumatic chemistry was a recent acquisition, and its distinguished discoverers (Black, Priestley, and Cavendish) were still flourishing; analytical chemistry, and chemistry applied to nature and the arts, were even less advanced: in brief, the known boundaries of the science were of small extent, the knowledge of it easily acquired, and in every direction unexplored regions tempted enterprise and ambition.

Nor is it undeserving of mention, that the course of study which he himself had followed previous to his entering on chemistry, was well adapted to aid in the acquisition of the latter: in fact, it was just that course which, in his posthumous work in the dialogue called the "Chemical Philosopher," he recommends as a preparatory one. From his school education he had acquired a tolerable knowledge of Latin and Greek; after leaving school, he had learned French so as to read works in that language with perfect facility, and to speak it fluently (though not with a good pronunciation; for his master was a Breton); he had mastered the rudiments of the mathematics; his mind had been exercised in metaphysical discussion; and his reading had been more extensive than most people would imagine, either considering his youth, or what might be supposed the means within his reach. There is now before me a list of books which he read before quitting Penzance;



it is furnished by Mr. Coulson from his own knowledge. In this list are enumerated "Locke's Essays—Reid's, and Stewart's, Enfield's History of Philosophy, Rollin's Ancient History, Gibbon's Decline and Fall of the Roman Empire, History of Modern Europe, Hume's Essays and History, Thomson's Seasons, Milton, and Shakspeare." Besides these, there were many other works which he perused, both of science, literature, and poetry, either belonging to his family, or borrowed from his friends, or procured from a book club in Penzance, to which he was a subscriber.

Lastly, it may be remarked, his professional pursuits accorded with his chemical, and even promoted them. This was a circumstance of some importance, inasmuch as he could conscientiously devote a considerable portion of his time to his favourite science without any feeling of impropriety, with the conviction, that the knowledge he was so assiduously gaining, might be of the greatest use to him, both in the study and practice of the healing art.

How he conducted himself during his apprenticeship, as a student of medicine, and as an assistant of his master, now requires to be mentioned. It would appear that he applied himself with earnest zeal to his professional studies and duties, and that he gained equally the good opinion of Mr. Borlase and of his patients, especially of the poorer class, to whom he showed particular kindness. Mr. Borlase's high opinion of him, and estimation of his deserts, was proved by an act of generous kindness, which will be noticed in its place; and this gentleman's sister, Mrs. Foxell, bears testimony to the humane way in which he behaved towards those in humbler life. She has told my sister, that, "in all cases of distress, she used to call upon him, and

always found him ready to render every assistance in his power; and that she had often heard him say that he wished to make himself useful to his fellow-creatures."

Of the exact nature and extent of his medical studies I am not able to give a precise account. Mr. Borlase was much above the level of country practitioners in general, both in professional and literary attainments; it may be fairly inferred that he would give all the instruction in his power to his favourite pupil. His collection of medical works was, I believe, pretty extensive and good; and to these alone my brother's reading was not confined: he used freely the books which belonged to his friend, Mr. John Tonkin, and he had probably the use of Dr. Tonkin's library, not to mention some medical and surgical works which had belonged to a Mr. John Davy, a surgeon, and a near relation. His progress in his profession must have been considerable, as when he went to Bristol, in the fourth year from the commencement of these studies, he was considered competent by Dr. Beddoes to take charge of the patients belonging to the Pneumatic Institution.

Though intensely devoted to study and the acquisition of various knowledge, he did not, however, give up shooting and fishing. With his gun and dog (an excellent water spaniel, called Chloe\*), he often went to the adjoining marshes, where he became a proficient in

\* This favourite dog is well remembered in Penzance. Having been taken from her mother as soon as born, with the greater part of the litter, she was about to be drowned. He begged the gift of her, and, by means of great care, reared her. My sister writes, that, "on his first return from Bristol, after an absence of about twelve months, Chloe did not remember him till he called her by name, and then she was in a transport of joy." Her descendants are now numerous in the Mount's Bay, and prized for good qualities.

snipe shooting; or to the more distant covers in the warm valleys frequented by the woodcock\*, a kind of shooting of which he was ever afterwards extremely fond. His fishing excursions were chiefly in spring, when the small streams are in the best state for angling—turbid, in a slight degree, from the mild rains common in April and May. His early angling was like that of Isaac Walton; he was not then initiated into the nobler mysteries of fly-fishing.

This period of his life was, I believe, a very happy one: I mean the last year he spent at Penzance. He had become conscious of his own powers of intellect; he had an enthusiastic delight in the exercise of them; vast fields of unexplored science opened before him. The love of knowledge; the desire of distinction; the hope of benefiting mankind; in brief, every good motive that can act on a generous mind influenced him. Mr. Coulson, who was very intimately acquainted with him at this time, was strongly impressed with the conviction of his great capacity, and also of his nobleness of character. In a paper now before me, written by him, he concludes with observing that, “had he been left to his bent without any disturbing impulse, that is, without the connections which he fell into from his peculiar situation, he would have exhibited to the world a much nobler elevation than even that to which his great powers raised him.”

The state of his mind and feelings is portrayed in vivid characters in one or two passages which

\* At that time, in Cornwall, little attention was paid to the game-laws; every one who chose amused himself with a gun, and went in pursuit of the minor caccia, birds of passage, such as the woodcock, snipe, and water-fowl, without any licence, and without apprehension of question.



I have found in his note-books kept during this period:—

“I have neither riches, nor power, nor birth to recommend me; yet, if I live, I trust I shall not be of less service to mankind and to my friends than if I had been born with these advantages.” And this early sentiment never forsook him: even in his last days he had a feeling of the same kind, looking forward, were his life spared, to greater exertions. Another passage I shall give, which I consider applicable to him, though I am not sure that he wrote it of himself: if the feelings were intended for an ideal character, I have no doubt they had been experienced in great part by himself. It is a fragment amongst fragments:—

“I gradually became conscious of my powers, by comparing them with those of others. That solitary enthusiasm, however, which constituted my independence was never lost. I was no longer anxious to know what others thought of me, and I panted little after the breath of fame. Hence, agitated by no passion but the love of truth, the desire to see things in their real light counteracted every other desire. My conversations were plain and simple; I perceived that circumstances and the development of my moral powers had produced, or, rather, gradually unfolded, a new moral character. It was this character that I sought to improve, by casting from me every trait of hypocrisy and concealment. I considered all my possible relations with men, and I found no one which could again possibly turn me over to dependence.”

It has been already stated, that, in the short space of about four months from the time he commenced the study of chemistry, he was in correspondence with Dr. Beddoes on the subject of heat and light. Soon after,

Dr. Beddoes offered him the situation of superintendent of the Pneumatic Institution, which had been established at Clifton for the purpose of trying the medicinal effects of different gases. After some negotiation respecting the terms of the appointment (in which Mr. Davies Gilbert aided him in a very friendly manner), he gladly accepted it, with the consent of all his friends, excepting Mr. John Tonkin (who had hoped he would have settled at Penzance), and with the approval of Mr. Borlase, who (the period of his apprenticeship not being expired), in a very generous manner, released him from "all engagements whatever, on account of his excellent behaviour;" adding, "because, being a youth of great promise, I would not obstruct his present pursuits, which are likely to promote his fortune and his fame." This I have copied from the back of the indenture now before me, written, and signed by Mr. Borlase on the 1st of October, 1798. On the following day he left his home, to enter upon his public career, before he was twenty years old. Even at this time, when starting in life, the objects of science were a main consideration with him; and the expectation of having ampler means for indulging his love of inquiry was, I believe, the chief temptation which prevailed with him to quit Penzance, and the prospects which he there had of moderate independence. In a letter to Dr. Beddoes, written when the engagement was concluded (of which I find a portion of the rough draught in one of his notebooks), he says, "I have now made all the experiments I can make *here*: a very short time will arrange and collect them; but this I can do better at Clifton than at Penzance."

## CHAPTER II.

Letter to his mother on quitting home—Advantages of his situation at Clifton—Character of Dr. Beddoes—Of Mr. Poole—Notices of his researches, in connexion with his philosophical opinions—Extracts from his note-books, illustrative of the same—First visit home—Lines on the occasion—Farther extracts from note-books, showing his varied pursuits, and modes of sentiment and thought—Fragments of a poem—Happy life and aspirations—Letters expressive of these—Accepts an appointment in the Royal Institution—List of his publications whilst at Clifton.

THE following letter, descriptive of youthful mind, and of the feelings of youth on going out into the world,—written shortly after his arrival at Clifton, may serve as an introduction to this period of his life. The reader will please to keep in mind to whom it was addressed, and the occasion, and that it was intended solely for a mother's perusal.

“October 11th, 1798. Clifton.

“My dear Mother,

“I have now a little leisure time, and I am about to employ it in the pleasing occupation of communicating to you an account of all the *new and wonderful* events that have happened to me since my departure.

“I suppose you received my letter, written in a great hurry last Sunday, informing you of my safe arrival, and kind reception. I must now give you a more particular account of Clifton, the place of my residence, and of my new friends, Dr. and Mrs. Beddoes, and their family.



“ Clifton is situated on the top of a hill, commanding a view of Bristol and its neighbourhood, conveniently elevated above the dirt and noise of the city. Here are houses, rocks, woods, town and country, in one small spot; and beneath us, the sweetly flowing Avon, so celebrated by the poets. Indeed, there can hardly be a more beautiful spot: it almost rivals Penzance, and the beauties of Mount's Bay.

“ Our house is capacious and handsome; my rooms are very large, nice, and convenient; and, above all, I have an excellent laboratory. Now for the inhabitants, and first, Dr. Beddoes, who, between you and me, is one of the most original men I ever saw—uncommonly short and fat, with little elegance of manners, and nothing characteristic *externally* of genius or science; extremely silent, and in a few words, a very bad companion. His behaviour to me, however, has been particularly handsome. He has paid me the highest compliments on my discoveries, and has, in fact, become a convert to my theory, which I little expected. He has given up to me the whole of the business of the Pneumatic Hospital, and has sent to the editor of the Monthly Magazine a letter, to be published in November, in which I have the honour to be mentioned in the highest terms. Mrs. Beddoes is the reverse of Dr. Beddoes—extremely cheerful, gay, and witty; she is one of the most pleasing women I ever met with. With a cultivated understanding, and an excellent heart, she combines an uncommon simplicity of manners. We are already very great friends. She has taken me to see all the fine scenery about Clifton; for the Doctor, from his occupations and his bulk, is unable to walk much. In the house are two sons, and a

daughter of Mr. Lambton, very fine children, from five to thirteen years of age.

“I have visited Mr. Hare, one of the principal subscribers to the Pneumatic Hospital, who treated me with great politeness. I am now very much engaged in considering of the erection of the Pneumatic Hospital, and the mode of conducting it. I shall go down to Birmingham to see Mr. Watt and Mr. Keir in about a fortnight, where I shall probably remain a week or ten days; but before then you will again hear from me. We are just going to print at Cottle’s, in Bristol, so that my time will be much taken up, the ensuing fortnight, in preparations for the press. The theatre for lecturing is not yet open; but, if I can get a large room in Bristol, and subscribers, I intend to give a course of chemical lectures, as Dr. Beddoes seems much to wish it.

“My journey up was uncommonly pleasant; I had the good fortune to travel all the way with acquaintances. I came into Exeter in a most joyful time, the celebration of Nelson’s victory. The town was beautifully illuminated, and the inhabitants loyal and happy. I was so pleased with Mr. Russel and his family, and some other of the inhabitants to whom I was introduced, as to stay there two days, which I chiefly spent with Mr. Russel. The morning after the illumination I rode round Exeter with Mr. Russel, and was wonderfully delighted with the country, which is the most beautiful and the most highly cultivated of any I have yet seen.

“It will give you pleasure when I inform you that all my expectations are answered, and that my situation is just what I could wish. But, for all this, I very often think of Penzance and my friends, with a wish to

be there : however, that time will come. We are some time before we become accustomed to new modes of living and new acquaintances.

“ Believe me, your affectionate Son,  
“ HUMPHRY DAVY.”

If the situation he had accepted of superintendent of the Pneumatic Institution had been created purposely for him, it could not have been more suitable to the bent of his genius, or better adapted for calling into activity and developing fully the powers of his mind ; and the collateral circumstances generally were not less auspicious. The society he mixed with, Dr. Beddoes's family, of which he became an inmate, and even the scenery by which he was surrounded, all contributed to exercise a favourable influence over him.

The Pneumatic Institution owed its rise to Dr. Beddoes. It was supported entirely by subscription ; the subscribers to it were chiefly liberal men of science ; and the intention of founding it was to afford an opportunity of giving a fair trial to the medicinal effects of the different gases, with the sanguine hope then indulged in, started and supported by Dr. Beddoes, that powerful remedies might be found amongst them ; that diseases hitherto bidding defiance to medical art, by means of them might be cured or relieved ; and that, in the investigation of their operation, light would be thrown on many obscure parts of physiology, to the great benefit of medical science, both in regard to practice and theory. Such was the design of the institution, which was to be provided with all the means likely to promote it—an hospital for patients, a laboratory for experimental research, and a theatre for lecturing.



Dr. Beddoes himself was a very remarkable man, admirably fitted to promote inquiry, better than to conduct it. To give the reader an insight into his character, I shall introduce here a sketch of him, written by my brother in the last year of his life, when, a valetudinarian, he amused himself with looking back on his old friends and acquaintances, and in describing the most distinguished of them:—"Beddoes was reserved in manner, and almost dry; but his countenance was very agreeable. *He was cold* in conversation, and apparently much occupied with his own peculiar views and theories. Nothing could be a stronger contrast to his apparent coldness in discussion, than his wild and active imagination, which was as poetical as Darwin's. He was little enlightened by experiment, and, I may say, little attentive to it. He had great talents, and much reading, but had lived too little amongst superior men. On his death-bed he wrote me a most affecting letter, regretting his scientific aberrations. I remember one expression: 'Like one who has scattered abroad the *avena fatua* of knowledge, from which neither branch, nor blossom, nor fruit has resulted, I require the consolations of a friend.' Beddoes had talents which would have exalted him to the pinnacle of philosophical eminence, if they had been applied with discretion."

Dr. Beddoes's family was a very agreeable one: it owed its chief charm to Mrs. Beddoes whom I have always heard spoken of as a very delightful person, especially by my brother, who had a sincere regard and esteem for her, and ever after a grateful feeling of her kindness. I will not deprive myself of the pleasure of inserting here a copy of verses addressed to this lady, written by him some years after: there is this brief

notice attached to them: — “Glenarm, August, 1806, by moonlight, a view of the cliff and sea.” —

“ Think not that I forget the days,  
When first, through rough unhaunted ways,  
We moved along the mountain side,  
Where Avon meets the Severn tide ;  
When in the spring of youthful thought  
The hours of confidence we caught,  
And Nature’s children, free and wild,  
Rejoiced, or grieved, or frown’d, or smiled,  
As wayward fancy chanced to move  
Our hearts to hope, or fear, or love.

“ Since that time of transient pleasure  
Eight long years have fill’d their measure,  
And scenes and objects grand and new  
Have crowded on my dazzled view ; —  
Visions of beauty, types of heaven,  
Unask’d-for kindness freely given ;  
Art, Nature, in their noblest dress —  
The city and the wilderness ;  
The world in all its varying forms,  
Contentments, clouds, ambition’s storms.

“ Yet still in such a busy scene,  
And such a period pass’d between,  
The recollections never die  
Of our early sympathy :  
And in the good that warms my heart  
Your friendship bears a living part ;  
With many a thought and feeling twined  
Of influence healthy, noble, kind ;  
Virtues from your example caught,  
And without saws or precept taught.

“ The proof this tranquil moment gives  
How vivid the remembrance lives ;  
For e’en in Nature’s forms I see  
Some strong memorials of thee :  
The autumnal foliage of the wood,  
The tranquil flowing of the flood,

The down with purple heath o'erspread,  
The awful cliff's gigantic head,  
The moonbeam on the azure sky,  
Are blended with thy memory."

The society of Clifton at this time, of which Dr. Beddoes's house may be considered as the gathering point, was more literary and intellectual than usual. Many men of genius resided there, or in Bristol, or made it a place of frequent resort. The most distinguished amongst the number, Mr. Southey, Mr. Coleridge, and Mr. Tobin, had very little the advantage of my brother in age; they were entering with eager emulation on the course of glory; he formed their acquaintance and obtained their friendship; and though the great objects of his pursuit were of a scientific nature, yet he found time to take a part with them in labours purely literary.

As the reputation of the Pneumatic Institution increased, persons of consideration, and many men of rank and science, from various motives, either of health or curiosity, visited it from a distance, and afforded him an opportunity of forming valuable acquaintances. Of the former, I shall mention only one, the late Mr. Poole,\* of Nether Stowey, in Somersetshire, whose acquaintance with him began here, and soon ripened into a friendship which was cherished by both ever after.

\* Of this most amiable, excellent and talented man, (alas! now no more, he died in 1837,) there is an eulogy, written by Mr. Coleridge, worthy of both. "A man whom I have seen now in his harvest field, or the market; now in a committee-room with the Rickmans and Ricardos of the age; at another time with Davy, Wollaston and the Wedgewoods; now with Wordsworth, Southey, and other friends not unheard of in the republic of letters; now in the drawing-rooms of the rich and the noble; and now presiding at the annual dinner of a village benefit society; and in each, seeming to be in the very place he was intended for, and taking the part to which his tastes, talents, and attainments,



In the beginning of 1799, he took up his residence in a house in Dowery-square, Clifton, which was provided with a laboratory, and fitted up for the purposes of the institution. Here he applied himself with the greatest assiduity and zeal to various research;—as to the completing his experiments for, and finishing his essays on Heat and Light, before alluded to, which were published this year;—the determining of the nature of the epidermis of the hollow plants,—an investigation he undertook in consequence of the accidental observation of a child;—but, above all, investigating the

gave him an admitted right. And yet," (adds Mr. Coleridge) "this is not the most remarkable, not the individualising trait of our friend's character. It is almost overlooked in the originality and raciness of his intellect; in the life, freshness and practical value of his remarks and notices, truths plucked as they are growing, and delivered to you with the dew on them,—the fair earnings of an observing eye, armed and kept on the watch by thought and meditation; and above all, in its integrity, i. e. *entireness* of his being, (*integrum et sine cerâ vas*), the steadiness of his attachments, the activity and persistency of a benevolence, which so generally presses a warm temper into the service of a yet warmer heart, and so lights up the little flaws and imperfections, incident to humanity even in its choicest specimens, that were their removal at the option of his friends, (and few have, or deserve to have so many!) not a man among them but would vote for leaving him as he is."—This beautiful character was written of Mr. Poole when alive, and published in *Coleridge's Constitution of the Church and State*. I have extracted it from an affectionate discourse on the occasion of his death, delivered in the church of Nether Stowey, (Mr. Poole's place of residence,) on the 17th September, 1837, by the Rev. John Sandford. Alluding to the occasion, he depicts touchingly the feeling which accompanied it. "An event has occurred in this parish, which seems especially to call for the lessons and consolations of religion. It is one which has come home to the hearths and hearts of all among you. All brows are saddened with the same grief, and all mouths filled with the same lamentation. I behold the rare spectacle of an entire population, stricken with the same sorrow, mingling their tears together, and exclaiming, as with one voice, 'Our father, our father! the chariot of Israel, and the horsemen thereof.'"

effects of the gases in respiration. Of these, the nitrous oxide was one of the first he experimented upon. Its agency he found to be of a very novel and wonderful kind, contrary to all expectation, and almost exceeding belief. This discovery gave a particular direction to his inquiries, and may be considered as the origin of that work which contained their results, and which established his character as a chemical philosopher. It was published in the summer of 1800. Even before it was out of the press, he had embraced another train of research, new and most important;—he had begun that series of galvanic experiments which ultimately led to some of his greatest discoveries.

In regard to the formation of his scientific character, this was a very critical period of his life; and it is well shown in the manner in which he treated the different subjects of inquiry to which I have briefly alluded. He started in his career of chemical inquiry, as he had before done in metaphysical, in all the presumption of youthful daring, with undue confidence in his speculations, and in speculation in general. His first published essays on Heat and Light are very characteristic, as the bold attempts of an original and enterprising mind, and bearing the stamp, at the same time, of youth and of genius,—in the faults belonging to the one, and the redeeming qualities of the other, marked, as they are by invention, by a certain strength and precision of reasoning power, and by much ingenuity both of ideas and experiments, and also by want of caution, and the precipitancy of a very young man, which sometimes appears as a defect of modesty. He himself, with surprising rapidity, detected the errors into which he had fallen; and he did so probably mainly in consequence of the other researches in which he immediately

engaged, of a description fitted to afford precise results—and yet such that no ingenuity *à priori* could have conceived, and some of them so singular and surprising, that no imagination could have invented. He must now have become acquainted practically with the value of the Baconian maxim,—that first aphorism of the “*Novum Organum Scientiarum*,”—“*Homo Naturæ minister, et interpres, tantum facit et intelligit quantum de Naturæ ordine re vel mente observaverit: nec amplius sit, aut potest.*” Indeed, I am disposed to think, that after the publication of these essays, he almost immediately acquired, and for a short time felt, even an undue aversion to hypothesis. His own opinions expressed respecting these essays are strongly indicative of his altered views. “I began the pursuit of chemistry by speculations and theories: more mature reflection convinced me of my errors, and of the limitation of our powers,—the dangers of false generalization, and the difficulty of forming true ones.” This I find written in darker ink between the lines of a note-book kept in 1799, consisting chiefly of speculative views concerning the connexion of life and chemical action, or of physiology and chemistry. In another place, bearing date of August of the same year in which his essays appeared, is the following reflection:—“When I consider the variety of theories that may be formed on the slender foundation of one or two facts, I am convinced that it is the business of the true philosopher to avoid the  $\alpha$  altogether. It is more laborious to accumulate facts than to reason concerning them; but one good experiment is of more value than the ingenuity of a brain like Newton’s.” And, in the same note-book, written about the same time as the preceding, alluding to his essays, he says, “I was perhaps wrong in pub-



lishing with such haste a new theory of chemistry. My mind was ardent and enthusiastic. I believed that I had discovered the truth. Since that time my knowledge of facts is increased,—since that time I have become more sceptical.” His other inquiries referred to, in the manner in which they are conducted, strongly indicate his changed opinion, relative to the vainness of mere speculation,—they are, indeed, remarkably contrasted with his first,—they are purely experimental and inductive;—a convincing proof that he had now become, what he always after continued, the experimental and inductive philosopher.

No one ever engaged in pursuit with loftier views before him, or with more sanguine expectations of attaining them. The former is strongly indicated by a passage in a note-book, which was written in the winter or early spring of 1799, when his views respecting speculation were in progress of change. He remarks, “The brilliant discoveries which have enriched chemical science in these latter days, have, perhaps, induced the philosophers who made them to conclude too hastily that science had arrived at perfection. But though chemical theory has made some advance, when we consider our inability to calculate results; our ignorance of the attraction that binds many principles together, and of the composition of organic matter, we shall find that the field of nature is yet but little explored, and that the most sublime and important part of chemistry is yet unknown.”—“In doctrine,” he continues, “the attention has hitherto been confined to single and double affinities: even the union between the acids and alkalis, and metallic oxides, has been considered as effected by the simple attractions of the individual compounds; nothing has been done towards estimating

the attractions of the simple principles in compound substances. The perfection of chemical philosophy, or the laws of corpuscular motion, must depend on the knowledge of all the simple substances, their mutual attractions, and the ratio in which these attractions increase or diminish, with increase or diminution of temperature. These being ascertained, chemistry would become a science so far generalised as to enable calculations to be formed with regard to the result of any new apposition of particles. The first step towards these laws will be the decomposition of those bodies which are at present undecomposed." The bodies thus alluded to were the fluoric, muriatic, and boracic acids, the alkalies, and earths; the elements of all which, in a few years from this time, he succeeded in developing: even now he attempted it in regard to the acids, as some further extracts will show. I shall give them in the order in which they occur: they are well fitted to display the vastness of the scheme of research which he then proposed to enter upon. The following "Prospectus of Experiments" was written in the spring of 1799:—

"To decompose the muriatic, boracic, and fluoric acids; to try triple affinities, and the contact with heated combustible bodies at a high temperature."

"To ascertain all the phenomena of oxydation."

"To discover with accuracy the vegetable process."

Immediately after he notices other great undertakings which he contemplated:—

"Two great works,—

" 'The Laws of Corpuscular Motion.'"

" 'The Theory of Passion.'"

"Smaller ones,—

" 'The Theory of Light, founded upon Experiments.'"

“ ‘An Account of Experiments.’ ”

In the following page he asks, “ May we not be able to decompose muriatic acid by heating some of the muriates of the metals red, and sending sulphur in vapour through them? The muriate of lead might be tried in this way, or the muriate of copper. The attraction of copper for sulphur, and the attraction of sulphur for oxygen, would most probably effect the decomposition.” From which it is evident that, in conformity with the then received analogies, he supposed muriatic acid a compound of a base and of oxygen.

He proposes other methods to endeavour to effect the decomposition; but I can find no precise mention of the results, excepting of an experiment on electrifying, or passing sparks through muriatic acid gas, which underwent no change: there are, indeed, slight notices of experiments, which failed, just sufficient to bring them to his recollection; they were all unsuccessful, and did not require to be minutely recorded. He must have satisfied himself by his first trials, that his means at that time were not adequate to the end; and he does not appear to have renewed the attempt till his extended researches had made him master of a new agent of analysis, the power of which did not disappoint him.

The extraordinary zeal with which he devoted himself to research at this time, and his great powers of application, are forcibly shown in the rapidity of his labours. His “Researches” were published in the summer of 1800; a work so laborious might have sufficed for the life of an ordinary man; the materials of it were collected and put together in an almost incredibly short time. In a note-book now before me, there is a rough draft of a preface, in which he says, “These



experiments have been made since April, 1799, the period when I first breathed nitrous oxide. Ten months of incessant labour were employed in making them; three months in detailing them." So intense indeed was his application, and so little his regard for health or even life, which was often endangered, and once nearly lost from the breathing of carburetted hydrogen, that he was under the necessity of leaving the laboratory for a time, when most anxious to complete his inquiries, and seek the renewal of health and strength in his native air.

This his first visit home in the latter part of October, 1799, was marked by the same ardour as he showed in every thing he undertook. He wrote to announce his intention, and arrived before his letter. He then remained at Penzance about a month, variously occupied, dividing his time between his family and his old friends and his favourite amusements of fishing, shooting, geologising and experimenting. Though his visit was for so short a time and suddenly determined on, yet he brought with him a case of chemical apparatus considerably larger than the one which some years after, he carried with him on his continental travels.

Probably at this time, the following irregular verses were written in the enthusiasm of youthful feeling, on revisiting home, heightened by various emotions from acquired and anticipated fame in the pursuit of science:—

“Many days have pass’d,  
Beloved scene, since last my wet eyes saw  
The moonbeams gild thy whitely-foaming waves.  
Ambitious then, confiding in her powers,  
Spurning the prison,—onward flew my soul,  
To mingle with her kindred ; — in the breeze  
That wafts upon its wings futurity,

To hear the voice of praise ; — and not in vain  
Have these high hopes existed, — not in vain  
The dew of labour has oppress'd my brow,  
On which the rose of pleasure never glow'd ;  
For I have tasted of that sacred stream  
Of science, whose delicious water flows  
From Nature's bosom. I have felt the warmth,  
The gentle influence of congenial souls,  
Whose kindred hopes have cheer'd me ; who have taught  
My irritable spirit how to bear  
Injustice ; who have given  
New plumes of rapture to my soaring wing  
When ruffled with the sudden breath of storms.  
Here, through the trembling moonshine of the grove,  
My earliest lays were wafted by the breeze, —  
And here my kindling spirit learn'd to trace  
The mystic laws from whose high energy  
The moving atoms, in eternal change,  
Still rise to animation.  
Beloved rocks ! thou ocean white with mist,  
Once more with joy I view thee ;  
Once more ye live upon my humid eyes ;  
Once more ye waken in my throbbing breast  
The sympathies of nature. Now I go  
Once more to visit my remember'd home,  
With heartfelt rapture,—there to mingle tears  
Of purest love,—to feel the ecstatic glow  
Of warm affection, and again to view  
The rosy light that shone upon my youth."

Besides chemical there were other pursuits which had a portion of his time at Bristol : these require notice as exemplifying the varied powers of his mind, and that at a time when he was most intensely occupied in experimental research.

The following memorandum, which occurs in a notebook kept when he first went to Bristol, will give the reader a distinct idea of the intellectual life he then led, and of that variety of pursuit just alluded to:—

"*Resolution.*—To work two hours with pen before

breakfast on the ‘Lover of Nature;’ and ‘The Feelings of Eldon,’ from six till eight; from nine till two, in experiments; from four to six, reading; seven till ten, metaphysical reading (i. e. system of the universe).”

And his note-books generally, at this period, were not less characteristic; they contain mixed together, without the least regard to order, schemes and minutes of experiments, passing thoughts of various kinds, lines of poetry (but these are in small proportion), fragments of stories and romances, metaphysical fragments, and sketches of philosophical essays. Some specimens may not be uninteresting.

Amongst the last-mentioned, the essays, there is one on Education, one on Luxury, one on Genius, and one on Dreaming. That on education is called “Hints towards a Treatise to be entitled Observations on Education and the Formation of the Human Intellect, designed for the Use of Parents and Instructors.” In the beginning of it he adverts to the impulses to which the foetus *in utero* is exposed, according to a very early speculation already mentioned. He supposes that the feelings which may be there experienced by means of the sense of touch and of hearing “may have an influence on the individual, in the same manner as the feelings of the first two or three years of childhood, though not recollected, may have on the character of the man.” He next considers how the child may be affected after birth; what are the sources of its pleasures and pains; and how the passions result from them. He insists on the propriety of not associating pain with moral agents, and of giving infants as little pain as possible, soothing them when cross, and not beating them, so that the irascible passions may be kept down, and not excited. On the same humane principle, when



children are ill, he inculcates the opposing irritable and peevish feeling by all innocent means adapted to amuse and please them, so that their attention may be diverted from pain. He hints at the punishment of children, when necessary, by machines, that the pain inflicted may not be associated with a moral agent. He alludes to the "detestable practice of humouring children by turns." He proposes showing them the beauties of nature. He notices "the miserable habit of punishing them by anticipated pain, by which that pain becomes associated with ideas which have no relation to the fault." These are some of the heads of the treatise belonging to the first era; others of a second and third era are also given, but without any details. It is probable that he never went further with this intended treatise; yet here and there notices are dispersed, as if in the way of preparation for it, and indicating that the subject was still floating in his mind. There occurs in one of his note-books the opening of a romance, "The History of Passion; a Philosophical Narrative," which was perhaps intended to embody his ideas on the subject of education, and the development of the human character; and it is preceded by the following sketch of man in his progress through life:—

- "The Infant, being of sensation.
- "The Youth, being of imagination.
- "The Lover.
- "The Social being.
- "The Logopathist.
- "The Lover of money.
- "The Lover of science.
- "The Lover of nature.
- "Recurrence of former feelings.

“The Lover of future existence.”

Hereafter I shall insert a poem of his, which was written, in part, in 1801, and which bears the stamp of the same train of thought; as, indeed, did his own life generally, as if he wrote from his perceptions of self more than from reflections on others.

Of the “Essay on Genius,” fragments merely were written. He commences with noticing “The wonderful difference in the nature of men, between those who are insignificant in their powers, and apparently isolated in their influences—who live only whilst they move, and cease to act as soon as they cease to exist; and those whose agency extends over the whole social world—who are full of energy in life, and leave behind them monuments of thought capable of perpetuating their existence.” He inquires, “What is this generating faculty of man, which acts through the immensity of ages? How is it produced, and in what manner does it operate?”

“Great powers,” he observes, “have never been exerted independent of strong feelings. The rapid arrangements of ideas, from their various analogies to the equally rapid comparisons of these analogies, with facts uniformly occurring during the progress of discovery, have existed only in those minds where the agency of strong and various motives is perceived—of motives modifying each other, mingling with each other, and producing that fever of emotion, which is the joy of existence, and the consciousness of life.”

The heads (for there is little more) of his “Observations on Luxury” express clearly his opinions on this subject, and they are not unworthy of maturer years; nor do I believe that he ever swerved from the principles contained in them, though at times, some of his habits

of life might appear to be, as they were said to be, luxurious. I shall make only one extract from them :—

“Nature and domestic attachments the true sources of happiness. Cosmopolitanism, the love of notoriety, not fame,—the love of pleasure, all fatal to the first and strongest feelings of our nature. In general society, the feelings are so mixed up, and prevented from ever arriving at maturity; hence the *petit maître-ism* of men and women of quality.”

On the subject of dreams a good many observations occur, and many of them arising out of his own experience. His theory of them is expressed in the following passage :—

“Our waking existence is composed of impressions, ideas, and feelings, of different degrees of vividness, which succeed each other in what may be called trains. The past is simple memory, the future is analogy, and the present is made up of impressions, sometimes, though rarely, simple, but often mixed or associated with the past and the future. In dreams, all the ideas occurring seem to be of one degree of vividness. There is neither past nor future, no mixture of impressions with ideas; the feelings occur as in waking, though seldom connected with what may be called the secondary reflective feelings, those produced when an action, at first pleasant, after a time becomes the contrary. The mixtures of memories and analogies, which are mingled, in waking, by the peculiarly modifying and connecting impressions in the order of nature, are here called up and modified only by slight organic feelings; generally so slight as to lose their independent existence, and can only be traced by impressions which are connected with them.”



The works of fiction, to which, it has been remarked, he even now occasionally turned his attention, from the fragments of them which remain, appear to have been intended to illustrate, in a popular manner, his own philosophical and metaphysical views; such as "The Child of Education, or the Narrative of W. Morley;" "The Lover of Nature, or the Feelings of Eldon;" "The Dreams of a Solitary;" "Imla, the Man of Simplicity; a Romance;" "The Villager; a Tale for the common People, to prove that great Cities are the Abodes of Vice," &c. Of some of these only the titles and plans are given; of others, portions are written; but they are so intermixed with notices on other subjects, and reflections, that it is often difficult to distinguish between what is noted down as his own sentiments and feelings, and what is sketched as the sentiments and feelings of the imaginary persons of his stories. In this respect there is a considerable resemblance between these fragments and the last works which he composed; viz. "Days of Fly-fishing," and "The Last Days of a Philosopher," or "Consolations in Travel;" and it is curious to see that between them there are other and more important points of resemblance; as if in his latter days, when he was no longer able in sickness to apply himself to the laborious researches of science, there was a renewal of his former ideas, a revival of former intentions, and with them of early trains of thought and feeling. I shall give some extracts, partly with a view of showing this; and, first, a sketch of a reverie, not unlike part of that which is described in the "Consolations in Travel" to have occurred in the Colosseum.

"I awoke at midnight: the recollection of indistinct but painful visions passed across my mind; the spectre

of horrible images still trembled in my eyes when I raised them to the light which shone through the green windows of my chamber. The moon was high in heaven; the sky was blue and cloudless; the woodbine, that surrounded the casement, was waving its dark foliage to the breeze. How intimately connected together are life, light, and motion! I was no longer solitary, no longer terrified; the restless and uneasy feeling which superstition, almost conquered by reason, is capable of awakening in the mind, disappeared before the beautiful, or combined with it to form sublime energy. You know a moonlight scene is peculiarly delightful to me; I always considered it as beautiful: but so much solitary enthusiasm, so much social feeling, so much of the sublime energy of love, of sorrow, and consolation, have occurred to me beneath the moonbeams, on the shore of that sea where Nature first spoke to me in the murmurs of the waves and winds, in the granite caves of Michael, that it is now become sublime. Restless, and filled with vivid imaginations, I was unable to sleep: I arose and stole to the window. The moon had just sunk beneath the ruins of the abbey, and her broken and trembling light shone through the west windows upon the burying-ground; beyond which the moving waters of the Wye were dancing and murmuring beneath the light. For a few minutes I was lost, and swallowed up in impression. No longer connected with the earth, I seemed to mingle with Nature; I pursued the dazzling of the moonbeams; I raised myself above the stars, and gave imaginary beings to the immeasurable paths of ether. But when I cast my eyes on the remains of mortality, —when I considered, that in that deserted spot, where the song of the nightingale and the whispering of the

wings of the bat were the only signs of life, thousands of thoughts, an immense mass of pleasurable ideas, had rolled through the minds of a hundred intelligent beings,—I was lost in a deep and intense social feeling. I began to think, to reason, What is existence? What is this eternal series of changes in life, in thought, and sentiment? The globe undergoes no physical revolution, whilst the physical organised beings upon the surface of it are perpetually modifying; the laws by which the physical phenomena of the universe are ruled are always the same: are there no laws by which the moral phenomena are governed? Nothing remains of them but mouldering bones; their thoughts and their names have perished. Shall we, too, sink in the dust? shall we, too, like these beings, in the course of time, be no more? shall that ever-modified consciousness be lost in the immensity of being? No, my friend, individuality can never cease to exist; that ideal self which exists in dreams and reveries, that ideal self which never slumbers, is the child of immortality, and those deep intense feelings, which man sometimes perceives in the bosom of Nature and Deity, are presentiments of a more sublime and energetic state of existence.”

The following passage, strongly expressive of sympathy with nature, reminds me of the vivid and beautiful description in the “*Consolations in Travel*,” at the opening of the third dialogue, in approaching Pæstum:—

“To-day, for the first time in my life, I have had a distinct sympathy with nature. I was lying on the top of a rock to leeward; the wind was high, and everything in motion; the branches of an oak tree were waving and murmuring to the breeze; yellow clouds, deepened by grey at the base, were rapidly floating



over the western hills; the whole sky was in motion; the yellow stream below was agitated by the breeze; everything was alive, and myself part of the series of visible impressions; I should have felt pain in tearing a leaf from one of the trees." There is a break in the writing, and a metaphysical remark follows:—"Deeply and intimately connected are all our ideas of motion and life, and this, probably, from very early association. How different is the idea of life in a physiologist and a poet!"

The following passage was almost prophetically true of himself, descriptive of the feelings of a philosopher in his last hours; such as he imagined them in youth, such as he found them thirty years after, when I joined him at Rome, in his last illness:—

"Behold me on the couch of death, my senses lost, my organs falling towards that state in which they will resolve into their primitive atoms: still is my mind unconquered, still all my passions, all my energies, are alive; still are all my trains of thinking complete. Philosophy has warmed me through life: on the bed of death she does not desert her disciple. The frost of the grave can never chill those burning energies connected with the thoughts of future existence. I feel and believe that the genial warmth of the sun of immortality, which has shone through this shattered frame with feeble light, shall be more permanent in the regions of bliss. I feel within me new energies; these hopes do not announce pain or annihilation. Oh, happy man! oh, benevolent Deity! thou art every where existing; and where thy permanent essence is interfused, pain cannot be permanent. Then the vain philosophy of the schools, the dull and dry heaps of words which have been called metaphysics, crossed my

mind; but their influence was lost, and swallowed up in the genial illumination, as the noise of the mountain torrent amidst the majesty of visible imagery is lost and disregarded."

The next extract carries me back to his early youth; and the manner, as related already, in which he entertained his schoolfellows; and it was probably drawn from the recollection of himself at that time:—

"After reading a few books, I was seized with the desire to narrate, to gratify the passions of my youthful auditors. I gradually began to invent, and form stories of my own. Perhaps this passion has produced all my originality. I never loved to imitate, but always to invent: this has been the case in all the sciences I have studied."

Of the many remarks written at this period which occur scattered through his note-books, I shall select a few as specimens of his modes of thought, some of a miscellaneous nature, some relating to science and philosophy:—

"General terms—what some metaphysicians have called abstract ideas, arise from the association of analogy by a very simple operation—not, as Jean Jacques Rousseau supposed, by a very complicated one.

"No metaphysical system, and, indeed, no system can be any thing more than a history,—not in the order of impression, but in the order of arrangement by analogy.

"Atheism the necessary consequence of materialism.

"Consistency in regard to opinions is the slow poison of intellectual life—the destroyer of its vividness and its energy.

"We are accustomed to consider thought and language as almost synonymous. What an immensity of

feelings, what an innumerable quantity of perception, must necessarily impress the mind of all men. Writing and speaking are arts, like music and painting, to express some of them only.

“Our opinions are much oftener formed by our feelings, and modified by them, than our feelings by our opinions: arguments in general an instance of this. Passion, or uneasy feeling, produces assents or dissents of different kinds.

“Our actions are neither the result of feelings or opinions; they are modified by them both, but are produced by habits.

“What is imagination? Almost always the recurrence of remembered visible imagery, under the influence of hope or fear.

“Almost all great deeds arise from a plenitude of hope or desire. No man ever had genius who did not aim to execute more than he was able.

“The sciences and the arts ought to be considered as related to man only so far as they are capable of promoting his happiness. Our knowledge of their capabilities must be founded upon an estimate of the powers and faculties of the human mind, and the sources of enjoyment which are within the reach of these faculties and powers.

“Philosophy is simple and intelligible. We owe confused systems to men of vague and obscure ideas.

“We ought to reason from effects alone. False philosophy has uniformly depended upon making use of words which signify no definite ideas.

“Our knowledge is little indeed: and scepticism in regard to theory is what we ought most rigorously to adhere to.

“Experimental science hardly ever affords us more



than approximations to truth; and whenever many agents are concerned we are in great danger of being mistaken.

“Theories ought to be made for time, and be considered capable of improvement.

“That man must indeed be badly organised whom nature is incapable of instructing. The theorising habit in a sound mind can counteract only for a short time the love of seeing things in their real light; and the illusions of the imagination, in proportion as they often occur, and are destroyed by facts, will become less vivid and less capable of permanently misleading the mind.

“The feeling generally connected with new facts enables us to reason more rapidly upon them, and is peculiarly active in calling up analogies.

“In physical science, the imperfections of our instruments of investigation, the fallacies to which we are liable from the modifications of impressions by the state of feeling, and the minute nature and the complicated relations of the objects of research, prevent us from attaining to that state of certainty afforded by the results of the science of quantity. The physical sciences involve the universe, man, and nature, in all their modifications, and all their newly acquired powers. They are at once the instruments and subjects of examination. Probabilities are the most we can hope for in our generalizations; and whenever we can trace the connection of a series of facts, without being obliged to imagine certain relations, we may esteem ourselves fortunate in our approximations.

“One use of physical science is, that it gives definite ideas.”

I shall give one fragment more, indicating the desire

he then felt to benefit mankind, and which, to the last, never forsook him:—

“ Shall those arts which have discovered a thousand instruments for inflicting pain or suffering on civilised man, never discover any new means of making him happy? Shall the fruit of the tree of knowledge always continue bitter; shall it never be ripened by the radiance of the sun of benevolence? If there be any sufficiently cold-hearted to believe this, let them remain idle. To us hope, which, though it should be vain, is yet an eternal source, will remain; it will ever prompt to actions which, though they should deserve no laurels of triumph from mankind, will never have raised them by watering the earth with blood.”

The quantity of poetry which he composed at this time was small; he was too much devoted to physical research to give much of his time to the Muses; and when he did address them, he seemed to think some apology was necessary. Thus, in a letter accompanying some lines on St. Michael's Mount (which were published in the “Annual Anthology”), he writes to his mother:—“I have sent you with this some copies of a poem on the place of my nativity; but do not suppose I am turned poet. Philosophy, chemistry, and medicine are my profession. I had often praised Mount's Bay to my friends here: they desired me to describe it poetically.” Yet, at times, I believe, he meditated some serious and long-continued exertion in these imaginative regions. This I infer from letters to him from his poetical friends, which I have heard spoken of, and from a distinguished one in particular, proposing to him a joint work, a philosophic epic; and it may be inferred, also, from some fragments which remain in note-books of this period, of a poem in blank verse,

the subject of which was, the deliverance of the Israelites from Egypt, to have been named "Moses." The following is a verbatim copy of its plan, and of the characters which were to be introduced into it:—

## MOSES.

### BOOK I.

"Zipporah, and the six Daughters of Jethro, Priest of Midian, in watering their Father's Flock, are insulted by some Shepherds: Moses protects them, and assists them in watering their Flocks.—They take him to their Father's Dwelling.—Description of Pastoral Scenery.—Of the Patriarchal Manners.—Jethro, a Man of Energy, receives Moses with Affection.

### BOOK II.

"The great Festival of the God of Nature.—Customs of the Midianites.—Moonlight Scene, and Reflections of Jethro on the System of the Universe.—History of Moses.—His earliest Impressions connected with Pharaoh's Daughter.—His Knowledge of his Family, &c.

### BOOK III.

"Growing Love of Moses and Zipporah.—Moses agrees to stay with Jethro.—Their happy Pastoral Life.—Moses, in wandering in the Desert, falls down a Cataract.—Meets with Miriam.—She tells him of a Light of Glory surrounding his Body: believes himself under the immediate Inspiration of the Deity.—His Dreams.—Theory of Jethro.—He resolves to return to Egypt.



## BOOK IV.

“Meets Aaron—Sees his Mother.—Secret Conference at the Pyramids.—Goes and speaks to Pharaoh, who was the Companion of his Youth.—Jacobinical Sentiments.—Pharaoh calls the Magicians (Reference to these in Book II).—Visits Pharaoh’s Daughter.—She supplicates him.—The Plagues.—Lamentation for the Death of the First Born.

## BOOK V.

“March through the Desert.—Miraculous Appearance of the Son of God.—Destruction of Pharaoh and his Army.—Moses’ Song.—Amalek overcome.

## BOOK VI.

“Meeting of Jethro.—His Counsels.—Institution of Laws.—Communion with God on Mount Sinai.—Mosaic Account of Creation.—End.

“Moses a great but enthusiastic Man.—Zipporah his Superior in reasoning Powers and in Sensibility.—Pharaoh a Despot.—Jethro a Wonder, a philosophic Priest.—Joshua a Hero, *i. e.* a Murderer.—Hur.—Miriam the Prophetess, the Sister of Moses, a wonderful Woman.”

We have here a subject admirably adapted for the epic, and a plot abounding in all the circumstances most fitted to excite poetical interest, both in the writer and the reader. Had my brother applied all the powers of his mind to the work, I cannot but think he might have given to the world a poem which would have afforded delight and instruction—delight, even

if struck off in the heat of a youthful imagination; and instruction, could he have had the resolution to suspend its publication till it should have been corrected by his maturer judgment. But these are vain speculations; his genius was destined for other efforts. Some specimens of the composition which remain in the form of fragments I shall introduce. They may amuse the reader; and they show, if I am not mistaken, that he had not engaged in a theme beyond his powers:—

“ And loud she struck the harp, and raised the song,  
 Her ebon tresses waving in the wind ;  
 Her dark eye sparkling, and her bosom  
 Throbbing with transport high. — ‘ Thou, thou art he,  
 The chosen one of God,—the man foretold  
 The saviour of thy people. Prophet, chief,  
 And lawgiver of Israel ! at thy birth  
 Deliver’d to the waters, yet preserved,  
 By hand unhallow’d,—from the royal pomp  
 Of Pharaoh, and the dark idolatry  
 Of Egypt’s kingdom led to know thy God,  
 In nature and in solitude to feel  
 His mighty inspirations ! Go then forth :  
 In all the high unbroken strength of hope  
 Proclaim the Eternal One,—declare his will.  
 Let Egypt and the kindred nations know  
 That *He alone* is God !—that He will free  
 In terror and in wrath his chosen seed,  
 Exalt the oppressed, tread the tyrant low,  
 And scatter as the sand upon the blast  
 The people that rebel against His will.  
 Go forth his servant,—go deliverer ! ”

---

“ Oh, with what pleasure, with what strong delight  
 Does Nature, long subdued, imprison’d long,  
 By heavy action, and the cumbrous chains  
 Of earthly ceremony, assume her rights.

Like the mild zephyr of the full-born spring,  
 Succeeding to the frosty northern blast,  
 She felt that Nature meant her to perform  
 All soft and tender duties,—to become  
 A wife, a mother ; that her heart was form'd,  
 Not for the dull, inert, and callous round  
 Of earthly forms and state, but soft and fill'd  
 With power, and with passion, to become  
 All natural sympathies,—to interweave  
 Itself with other hearts,—to glow with rapture  
 At another's joy, and melt in sorrow  
 At another's woes."

---

" Gently flow'd on the waters, as the sun  
 Shone on them in full brightness ; the tall plants,  
 Shadowing around the little cradle, grew  
 In full luxuriance. Fishes sported in the wave,  
 Myriads of lovely insects fill'd the air,  
 And all she saw was life and happiness :  
 Her mind in deepest sympathy,—  
 ' Shall all things live, and Thou, the masterpiece  
 Of all things living, perish ?' "

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" What are the splendid visions, and the hopes  
 Of future days, but renovated thoughts  
 And ancient feelings waken'd into life  
 By some new accident, and tinged with hues  
 Bright in the glow of passion ? Oh, my father !  
 In vain the aspiring spirit strives to pierce  
 The veil of Nature, dark in mystery ;  
 In vain it strives, proud in the moving force  
 Of hopes and fears, to gain almighty power,  
 To form created intellectual worlds.  
 Its inborn images have all the stamp  
 Of outward things of sense. The priest's high God,  
 The Father of the thunder, He who dwells  
 In the blue heaven upon his throne of light ;  
 The demon of the coward, and the form—  
 The angel form—that to the tear-wet eye  
 Of some devotion-smitten maid appears,  
 Are clad in all the attributes of man,



Distorted by the changeful influence,  
Of passion's dreaminess."

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"But often in the heavens my wandering eye  
Has seen the white cloud vanish into forms  
Of strange unearthly lineaments.  
And often in the midnight's peaceful calm  
Have I been waked by strange unearthly tones,  
And often in the hour of sacrifice  
Felt strange ideal pleasures.  
My son! I see thine eye is turn'd  
Most doubtingly upon my countenance.  
In youth the enthusiastic mind,  
Or sees in all realities a dim  
And visionary world; or hardy in  
The plenitude of doubt, sees nothing  
But that which sense affects."

---

"He felt a sentiment of pleasure thrill  
Within his bosom, and the liberty  
Of free unbiass'd action sweeter seem'd  
Than all the pomp and luxury of state  
And chains of ceremony. The wild majesty  
Of Nature in her noblest mountain garb  
Came on his spirit.  
On the wild rock, and on the palm-clothed hill,  
And on the snowy mountain, Pleasure seem'd  
To fix her dwelling place, and Music mov'd  
For him in every torrent's murmuring sound,  
And balmy Sweetness dwelt in every breeze,  
And every sunbeam minister'd to life."

A poem on St. Michael's Mount, written by him at this time, has already been alluded to, on account of the excuse which he made for it: its concluding stanzas are descriptive of the then bias of his mind:—

"Thus to the sweetest dreams resign'd  
The fairy fancy ruled my mind,  
And shone upon my youth;"

But now to awful reason given,  
I leave her dear ideal heaven,  
To hear the voice of truth.

She claims my last, my loftiest song ;  
She leads a brighter maid along,  
Divine Philosophy,  
Who bids the mounting soul assume  
Immortal Wisdom's eagle plume,  
And penetrating eye.

Above Delusion's dusky maze,  
Above deceitful Fancy's ways,  
With roses clad, to rise ;  
To view a gleam of purest light,  
Bursting through Nature's misty night,  
The radiance of the skies.

Amidst his various pursuits at Clifton, all in accordance with his own tastes and wishes, rewarded by success in discoveries, by the approval and esteem of those around him, and by a reputation which few men so young ever earned, he appears to have passed a time of more than usual enjoyment, and to have indulged in sanguine hope, or rather assurance, of advancing fortunes in life, and of greater conquests in science. His letters home were strongly indicative of this happy state of mind. In one to his mother, he says, "We are going on gloriously; our patients are getting better; and, to be a little conceited, I am making discoveries every day." In another letter to her, speaking of Dr. Beddoes, he says, "You have been told he is fond of money; I assure you it is quite the contrary, he is good, great, and generous; and Mrs. Beddoes is the best and most amiable woman in the world. I am quite naturalised into the family, and I love them the more the more I know them." In another, after a visit to his friend, Mr. Gregory Watt at Birmingham, he, as

was usual with him, couples the pleasure he experienced with praise of those whom he liked. He formed there an acquaintance with Mr. Keir, an able chemist, and distinguished for much originality and independence of mind. "I was particularly sorry," he says, "to leave him, for he is both an amiable and a great man."

The two following letters I shall give entire; the second was addressed to his early benefactor, Mr. John Tonkin.

"Hot Wells, November 19, 1800.

"MY DEAR MOTHER,

"Had I believed that my silence of six weeks would have given you a moment's uneasiness, I should indeed have written long ago. But I have been much engaged in my favourite pursuit of experimenting, and in endeavouring to amuse two of my friends who have spent some days at the Institute. One of them is your quondam lodger, Gregory Watt, who desired to be kindly remembered to you and the family. The other you have heard me speak of; his name is Thomson; and he is one of the few to whom God has given a spirit carrying them above the common things of the world.

"Accept my affectionate thanks for your presents. I have received them all, and I have made a good use of them all. Several times has a supper on the excellent marinaded pilchards made me recollect former times, when I sat opposite to you, my dear mother, in the little parlour, round the little table eating of the same delicious food, and talking of future unknown things. Little did I then think of my present situation,



or of the mode in which I am, and am to be, connected with the world. Little did I then think that I should ever be so long absent from the place of my birth as to feel longings so powerful as those I now feel for visiting it again.

“I shall see with heartfelt pleasure the time approaching when I shall again behold my first home — when I shall endeavour to repay some of the debts of gratitude I owe to you, to the Doctor, and to my aunts. My next visit shall not be so short a one as the last. I will stay with you at least two or three months. You have let half your house. Have you a bed-room reserved for me, and a little room for a laboratory? Which part have you let?

“When I come to Penzance we will settle all about John; till then I should like for him to learn French and Latin with Mr. Dugart. The expense of this or any other part of his education I will be glad to defray. Do not by any means put him with Mr. Coryton. I have long procured the paints: if there is no vessel in the course of a week, they shall be sent off by the waggon.

“I will write to Kitty in the course of next month. I am glad to hear Grace is better. Remember me with affection to her. I have not yet seen Mr. Griffin. Any one who has lately seen my friends I shall be glad to see.

“Have the goodness to tell Mr. Borlase that I will endeavour to procure the book he wished for in London.

“All in the way of progress goes on nobly. My health was never better than it has been since I left Cornwall last. I shall be very glad to hear from you soon. You have a hundred objects to write about

interesting to me. I can write only of myself. Remember me with affection to all my friends (particularly the Doctor), my aunts and uncles. Love to Kitty, Grace, Betsy, and John.

“Farewell, my dear mother,

“I am your affectionate son,

“H. DAVY.”

“Dowery Square, Clifton, January 12, 1801.

“RESPECTED SIR,

“I have sent in the box enclosing this letter and a set of paints for John, two bottles, containing different preparations of phosphorus, with directions for using them. The mode of conveyance by the waggon is very slow; I shall not, therefore, attempt to fill my pages with any thing that may be called news. Never was the state of public affairs in England more confused than at this moment, and never were the hopes of peace and plenty\* feebler in the public mind.

“The apathy connected with politics and morals does not, however, prevail with regard to the physical and medical sciences. Agriculture, the first of the arts, was never cultivated with greater ardour than at present. Natural philosophy has lately been enriched with many curious discoveries, amongst which galvanism, a phenomenon that promises to unfold to us some of the laws of our nature, is one of the most important. In medicine, the inoculation for the cow-pox is becoming general, not in England alone, but over the whole of Europe; and, taking circumstances as they now stand, it promises gradually to annihilate small-pox.

“My discoveries relating to the nitrous oxide, the

\* The reader will remember that this was a time of extraordinary dearth.

pleasure-producing air, are beginning to make some noise : the experiments have been repeated, with the greatest success, by the professors of the University of Edinburgh, who have taken up the subject with great ardour ; and I have received letters of thanks and of praises for my labours from some of the most respectable of the English philosophers. I am sorry to be so much of an egotist ; yet I cannot speak of the Pneumatic Institution and its success without speaking of myself. Our patients are becoming daily more numerous, and our Institution, in spite of the political odium attached to its founder, is respected, even in the trading city of Bristol. I shall soon send you an account of the success we have had in curing some of the most obstinate diseases by new remedies. The nitrous oxide we have found very beneficial in many cases of palsy.

“I hope sincerely that you will pass over the winter without any return of your complaint. The weather was never milder in April than it is now at this place in January. The autumn and the spring seem to mingle together without being separated by a winter.

“I am at this moment very healthy and very happy : I have had great success in my experiments, and I gain a competence by my pursuits, at the same time that I am (in hopes at least) doing something towards promoting the public good. If I feel any anxiety, it is that of being removed so far from you, my mother, and my relations and friends. If I was nearer, I would endeavour to be useful to you ; I would endeavour to pay some of the debts of gratitude I owe to you my first protector and earliest friend. As it is, I must look forward to a futurity that will enable me to do this : but, believe me, wherever I am, and whatever may be my situation, I shall never lose the remembrance of obliga-



tions conferred on me, or the sense of gratitude which ought to accompany them.

“I remain, respected sir,

“With unfeigned duty and affection, yours,

“H. DAVY.”

His escape from the vices which are most seductive to youth in great cities, is feelingly described in the following fragment of a letter which exists in a notebook, addressed to one of his early home friends. Whether it was written at this exact time, or two or three years after, it is not easy to decide; an expression in it may seem to indicate a later period: but with him, who “lived intensely,” months were as years.

“We can trace back our existence almost to a point: former time presents us with trains of thoughts gradually diminishing to nothing; but our ideas of futurity are perpetually expanding; our desires, and our hopes, even when modified by fears, seem to grasp at immensity. This alone would be sufficient to prove the progressiveness of our nature, and that this little earth is but the point from which we start towards a perfection that is bounded only by infinity.”

After describing the different roads they were pursuing in life, he adds, “I do not always look back upon the interval that has elapsed since I left home, without shuddering at the dangers to which I have been exposed. I was at that age when the passions are most powerful; when ambition and folly, uncontrolled by experience, are the masters of the soul. Temptations speak every where to man in great cities, which are the abodes of luxury and vice. An active mind, a deep ideal feeling of good, a look towards future greatness, has preserved me. I am thankful to the Spirit who is every where,

that I have passed through the most dangerous season of my life with but few errors ; in pursuits useful to mankind, pursuits which promise to me, at some future time, the honourable meed of the applause of enlightened men."

This prophetic feeling of distinction was soon about to be realised. The Royal Institution, a short time previously, had been founded after a plan of Count Rumford's, with the intent of diffusing a knowledge of science, and of its applications to the common purposes of life, and of exciting a taste for science amongst the higher ranks. In consequence of the expected retirement of the professor of chemistry, Dr. Garnet, a successor was sought after ; and it was my brother's good fortune to be invited to accept the situation. I use the words good fortune, rather in relation to his scientific career, for which it was an admirable field, than in a money-making or merely worldly acceptance. He owed the appointment, I believe, to several circumstances, but chiefly, it is probable, to the reputation which he had earned by his scientific labours, and to the recommendation of Dr. Hope, the distinguished professor of chemistry in the University of Edinburgh, who had become acquainted with him personally about this time ;—grateful acknowledgments, indeed, to this effect, are expressed in a letter from my brother to Dr. Hope, of which the latter has favoured me with a copy. His words are, " I believe it is in great measure owing to your kind mention of me to Count Rumford that I occupy my present situation in the Royal Institution. I ought to be very thankful to you, for most of my wishes through life are accomplished, as I am enabled to pursue my favourite study, and at the same time to be of some little utility to society." The con-

ditions on which he was invited to the Royal Institution are mentioned in the following letter:—

“ 31st January, 1801.

“ MY DEAR MOTHER,

“ During the last three weeks I have been very much occupied by business of a serious nature. This has prevented me from writing to you, to my aunt, and to Kitty. I now catch a few moments only of leisure to inform you that I am exceedingly well, and that I have had proposals of a very flattering nature to induce me to leave the Pneumatic Institution for a permanent establishment in London.

“ You have perhaps heard of the Royal Philosophical Institution, established by Count Rumford, and others of the aristocracy. It is a very splendid establishment, and wants only a combination of talents to render it eminently useful.

“ Count Rumford has made proposals to me to settle myself there, with the present appointment of assistant lecturer on chemistry, and experimenter to the Institute; but this only to prepare the way for my being in a short time sole professor of chemistry, &c.; an appointment as honourable as any scientific appointment in the kingdom, with an income of at least 500*l.* a year.

“ I write to-day to get the specific terms of the present appointment, when I shall determine whether I shall accept of it or not. Dr. Beddoes has honourably absolved me from all engagements at the Pneumatic Institution, provided I choose to quit it. However, I have views here which I am loath to leave, unless for very great advantages.

“ You will all, I dare say, be glad to see me getting



amongst the *Royalists*, but I will accept of no appointment except upon the sacred terms of *independence*.

\*            \*            \*            \*            \*

“ I am your most affectionate Son,

“ H. DAVY.”

This letter, as appears from its date, was written on the 31st of January. In the middle of February he went to London; and five days after he mentions in another letter, that he is “ negotiating with Count Rumford concerning the professorship at the Royal Institution.” He adds, “ His proposals have not been unfair; and I have nearly settled the business.” The arrangement finally made was almost precisely that first proposed. He returned to Bristol, to give over his charge of the Pneumatic Institution, and take leave of his kind and respected friends there; and the month after he took up his abode in London.

The following is a list of his publications, whilst he was at Clifton, embracing the short period of little more than two years!

1. “ Essays on Heat and Light,” in Contributions to Physical and Medical Knowledge, principally from the West of England; collected by Thomas Beddoes, M.D. 1799.

2. “ Experiments and Observations on the Silix composing the Epidermis or External Bark, and contained in other parts of certain Vegetables, in ‘ A Journal of Natural Philosophy, Chemistry, and the Arts.’” By William Nicholson. Vol. III. 4to. 1799.

3. “ On the Nitrous Oxide, or Gaseous Oxide of Azote; on certain facts relating to Heat and Light; and on the discovery of the decomposition of the Carbonate and Sulphate of Ammoniac.” Idem. Feb. 1800.

4. "Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide and its Respiration." 8vo. 1800.

5. "An Account of some Experiments made with the Galvanic Apparatus of Signor Volta." Nicholson's Journal, Sept. 1800.

6. "Additional Experiments on Galvanic Electricity." Idem. Oct. 1800.

7. "Notice of some Observations on the Causes of the Galvanic Phenomena; and on certain Modes of increasing the Powers of the Galvanic Pile of Volta." Idem. Nov. 1800.

8. "An Account of some additional Experiments and Observations on the Galvanic Phenomena." Idem. Dec. 1800.

9. "Notices concerning Galvanism." Idem. Feb. 1801.

## CHAPTER III.

His reception as a Lecturer at the Royal Institution—Circumstances favouring his success—His manner as a Lecturer—As an Experimenter—His Habits at this time, and manner of living—Notice of his principal Scientific Labours and Discoveries between 1801 and 1807—Dangerous Illness in 1807—Lines written after his Recovery—Farther Notice of his Labours and Discoveries, from 1807 to 1812—Circumstances of his Personal History—His Marriage in 1812, and Relinquishment of the Professorship of Chemistry at the Royal Institution—Extracts from his Note-Book in Verse and Prose, whilst at the Institution.

THE duties upon which he entered at the Royal Institution were those of assistant lecturer on chemistry, and director of the laboratory; but, according to the terms on which he accepted the situation, this was merely a temporary arrangement, and to last only till he had prepared himself for filling the higher appointment of professor of chemistry. In a letter to his mother, the last referred to, after specifying the conditions, he says, “I hope to be able to undertake the professorship next year;” and the next year he did undertake it. On the 31st of May, 1802, he was formally appointed to this office by a resolution of the managers.

In the spring of 1801, six weeks after his arrival, he gave his first lecture. I shall transcribe an account of it from the *Philosophical Magazine*, a contemporary journal. Under the head of the “Royal Institution of Great Britain,” the editor remarks,—

“It must give great pleasure to our readers to learn



that this new and useful institution, the object of which is the application of science to the common purposes of life, may be now considered as settled on a firm basis. The lectures of Dr. Garnet have been such as do equal honour to the institution and the professor, and have been well attended.

“ We have also to notice a course of lectures just commenced at the institution, on a new branch of philosophy; we mean the galvanic phenomena: on this interesting branch Mr. Davy (late of Bristol) gave the first lecture on the 25th of April. He began with the history of galvanism; detailed the successive discoveries, and described the different methods of accumulating galvanic influence.

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“ Sir Joseph Banks, Count Rumford, and other distinguished philosophers, were present. The audience were highly gratified, and testified their satisfaction by general applause. Mr. Davy, who appears to be very young, acquitted himself admirably well. From the sparkling intelligence of his eye, his animated manner, and the *tout ensemble*, we have no doubt of his attaining distinguished excellence.” \*

“ The sensation created by his first course of lectures at the Institution,” says Mr. Purkis, “ and the enthusiastic admiration which they obtained, is at this period hardly to be imagined. Men of the first rank and talent,—the literary and the scientific, the practical and the theoretical, — blue-stockings and women of fashion, the old and the young, all crowded, eagerly crowded the lecture-room. His youth, his simplicity, his natural eloquence, his chemical knowledge, his happy illustrations and well-conducted experiments,

\* Phil. Magazine, No. xxxv. p. 281.

excited universal attention and unbounded applause. Compliments, invitations, and presents were showered upon him in abundance from all quarters; his society was courted by all, and all appeared proud of his acquaintance."

Independent of "his youth, his simplicity, his natural eloquence, his happy illustrations, and well-conducted experiments," his instant and great success as a lecturer was owing in part to circumstances of an auspicious kind, connected with the Institution, the period, and the state of science at the time.

The Royal Institution was a new experiment. Novelty in itself is delightful, especially to people of rank and fortune, who at that time, in consequence of the Continent's being closed, owing to the war, must have been delighted to have had opened to them a new and unexpected source of interest, fitted to amuse those who were suffering from *ennui*, and to instruct those who were anxious for instruction. The Royal Institution, moreover, was the creation of a large number of influential persons, both in the higher ranks of society and of science. This alone might have sufficed to render it fashionable, and, if fashionable, popular. The period, morally and politically considered, aided the effect: a time of great political excitement had just terminated; a time of gloom and despondency was then commencing. Whatever diverted the public mind, and afforded new objects of contemplation, pure and independent sources of amusement and gratification, must have been very welcome to all reflecting persons, even without taking into account the possible and probable good which might be conferred by the Institution on society, in accordance with the intentions with which it was first established: and the state of science

generally, and especially of chemical science, was, perhaps, the most auspicious circumstance of all. It had passed the stage of feeble infancy; it was just entering on that of vigorous youth; it was sufficiently advanced to display much beauty, and to excite deep interest; and it was not too much advanced to be beyond the comprehension of minds of ordinary powers devoting to it a moderate portion of time. Besides, chemistry had just then begun to form connections, which immediately enhanced its value and attractions, particularly with mineralogy and geology, with vegetable and animal physiology, and with the useful arts of life. It had served to explain the formation of basalt and of marble; and it was confidently expected that it would throw much light on the structure and formation of our globe generally. It had elucidated one function of animals—the important one of respiration; and it was hoped that it might be extended, in a similar manner, to the other functions of animal and vegetable life. It had afforded a rational theory for many of the arts, and had contributed to improve many of them: the steam-engine it had perfected; the balloon and diving-bell were essentially chemical inventions: there appeared no limits to the extension of its usefulness. Lastly, I may allude to its connection with imponderable substances, as with light, heat, electricity, and especially that form of electricity which had just then been discovered,—and to the study of which he had already devoted himself—galvanism, which, more than all the rest, was destined to increase the interests and extend the dominions of chemistry, and enlarge the circle of human knowledge; and which, duly appreciating its fitness to excite interest,—both on account of its importance and



novelty,—he selected as the subject of his first course of lectures.

In my former publication, in illustration of his powers, as a lecturer, I submitted from the MS. in my possession selected specimens of his lectures; first, as showing his power of exciting the interest of a mixed audience; secondly, the facility, it may be said felicity, with which he inculcated philosophical doctrines, the philosophy of science and the methods of scientific research; thirdly, how he added to the interest of his subject, and enforced the doctrines by biographical notices, in giving which he was most generous of praise, and as sparing of censure, as if he had considered the illustrious scientific men who had preceded him, in the light of parents, to whom a debt of gratitude as from a son to a father, was owing, and a tender respect;—and lastly, how, in his manner of treating the sciences which he taught, he blended the new with the old,—and by transferring the results of the laboratory to the theatre, in all their freshness, he imparted constantly to his lectures much of the charm and vigour of original discourses, by which means, even when addressing a popular audience, he was enabled to fix the attention even of the philosopher and man of science.

In further illustration, I shall make a few remarks, conveying the impression which they have left on my mind, and recording the manner in which they were conducted. He was always in earnest; and when he amused most, amusement appeared most foreign to his object. His great and first object was to instruct, and, in conjunction with this, maintain the importance and dignity of science; indeed, the latter, and the kindling a taste for scientific pursuits, might rather be considered

his main object, and the conveying instruction a secondary one. His lectures were almost invariably written expressly for the occasion, not a repetition of lectures; so that the same audience, year after year, might attend, without being wearied. He commonly wrote his lecture the day before he delivered it. On this day he generally dined in his own room, and made a light meal on fish. He was always master of his subject; and composed with great rapidity, and with a security of his powers never failing him. Latterly, he trusted a good deal to notes; and, excepting on particular occasions, wrote little more than the parts which he wished to make most impressive, especially the beginning and termination. It was almost an invariable rule with him, the evening before, to rehearse his lecture in the presence of his assistants, the preparations having been made and every thing in readiness for the experiments; and this he did, not only with a view to the success of the experiments, and the dexterity of his assistants, but also in regard to his own discourse, the effect of which, he knew, depended upon the manner in which it was delivered. He used, I remember, at this recital, to mark the words which required emphasis, and study the effect of intonation; often repeating a passage two or three different times, to witness the difference of effect of variations in the voice. His manner was perfectly natural, animated, and energetic, but not in the least theatrical. In speaking, he never seemed to consider himself an object of attention; he spoke as if devoted to his subject, and as if his audience were equally devoted to it, and their interest concentrated in it. The impressiveness of his oratory was one of its great charms; in this he consulted only his own taste and feelings; but at the same time, by a considerable

portion of his auditors, it must have been received as a compliment to their own taste and feelings, and powers of understanding; and, in giving them credit for acquirements, no doubt many flattered themselves they possessed them, or had a desire excited to attain them. His experiments were devised on the same principle, not of amusing and pleasing, but of illustrating his discourse, and demonstrating either important properties of bodies, or principles of the chemical action of bodies: he took great care that they should not appear to have been introduced for show, and to excite merely wonder, even when most brilliant and wonderful. And his eloquence,—the declamation, as it might be called by some, in which he indulged on the beauty and order of nature, in which he ascended from the works to the great Artificer, and from the admirable design every where apparent to the infinite wisdom of the Author of the universe,—his eloquence, I believe, on these topics was so well received, because it was not affected; merely his own strong impressions and feelings embodied in words, and delivered with an earnestness which marked their sincerity.

One of the principal motives which induced him to quit Bristol was the ampler scope he expected to have in the laboratory of the new institution for indulging his passion (for so his love may be called) for research. This was part of the agreement between him and Count Rumford, as is mentioned in a letter to Mr. Gilbert, in which he says, “The sole and uncontrolled use of the apparatus of the Institution for private experiments” was to be granted to him, with the promise of “any apparatus he might need for new experiments.” And I find from his note-books, that a few days after his arrival he resumed an experimental inquiry on galva-



nism, which, some months previously, he had commenced at Clifton.

The laboratory of the Institution I shall briefly sketch, such as I remember it when I first became its inmate, in the winter of 1808, when experimental researches were carried on within its walls with a zeal that it would be difficult to surpass, and were rewarded with discoveries of more than ordinary brilliancy. The room was spacious, well ventilated, lighted from above, and well supplied with water. It was divided into two compartments, nearly of equal dimensions; one the laboratory proper, the other provided with rows of seats to be used as a theatre for the accommodation of the students of practical chemistry. The apparatus most conspicuous and most in use were, a sand bath, for chemical purposes, and for heating the room; a powerful blast furnace; a moveable iron forge, with a double bellows; a blow-pipe apparatus, attached to a table, with double bellows underneath; a large mercurial trough, and two or three water pneumatic troughs, and various galvanic troughs; not to mention gasometers, filtering stands, and the common necessities of a laboratory, of glass, earthenware, &c.; and not to mention the delicate instruments liable to be injured by acid fumes, which were commonly kept in another room, as air-pumps, balances, &c. In brief, in regard to its equipment and appearance, it was altogether a working laboratory, designed for research: there was no finery in it, or fitting up for display; nothing to attract vulgar admiration; no arrangement of apparatus in orderly disposition for lectures, and scarcely any apparatus solely intended for this purpose. It was, indeed, an almost constant scene of laborious research; and the pre-

paration for the weekly lecture, or lectures, was considered not the most important matter, but rather as an interruption to the ordinary course of experimental investigation. In the laboratory, where my brother spent a great portion of every day that he was in town and at leisure, he was unremittingly engaged in original experiments; and even in his absence the operations were not suspended, they were continued by his assistants, according to the directions which he had given; and when he returned, he finished the experiment, or examined the results. Nothing was left to memory; an entry was made in a large book, kept for the purpose, of all that occurred, written either by himself, or by an assistant from his dictation; not, indeed, in minute detail, for that would have occupied too much time, but briefly, for aiding the memory, and minutely only in regard to weight and measure, and what was most important and characteristic. In his inquiries there never was any mystery or concealment, but the most perfect openness. The register of experiments was left open; he received his friends in the laboratory, and conversed with them on the objects of inquiry in progress; and however intensely engaged, he was always accessible. I can never forget his manner when occupied in his favourite pursuit; his zeal amounted to enthusiasm, which he more or less imparted to those around him. With cheerful voice and countenance, and a hand as ready to manipulate as his mind was quick to contrive, he was indefatigable in his exertions. He was delighted with success, but not discouraged by failure; and he bore failures and accidents in experiments with a patience and forbearance, even when owing to the awkwardness of assistants, which could

hardly have been expected from a person of his ardent temperament. And his boldness in experimenting was very remarkable: in the operations of the laboratory danger was very much forgotten, and exposure to danger was an every-day occurrence. Considering the risks run, and the few, if any, precautions taken against accidents, it is surprising how small a number of injuries were received. The only two serious wounds that I recollect he sustained, were in the hand and eye; the one, from receiving on his hand a quantity of melted potash; the other, from an explosion of a detonating compound. Had his constitution been bad, the use both of hand and eye would probably have been impaired; indeed, the eye ever after retained the mark of the wound inflicted on the transparent cornea, and never perfectly recovered its strength.

Of my brother's mode of living, and of some of his habits whilst he was at the Royal Institution, I shall also speak from my own knowledge. As long as he was a bachelor, he was perfectly satisfied with his rooms at the Institution, in which he considered chiefly utility, and thought little of comfort, and much less of luxury. He showed great carelessness in all that related to their furniture and appearance. These were to him matter of indifference. I believe the furniture was merely what belonged to them when he first took possession, and that he made no addition to it or alteration. The only thing elegant that I recollect in his sitting-room was an ornamental little porcelain Venus, which was a present to him from his early friend, Mr. Wedgwood; it was of his manufacture, and an admirable specimen of art. Letters and papers he very seldom arranged, and his rooms were commonly littered with them. Occasionally they were collected and thrown



together in a large cupboard. I remember once his commissioning me to look over this great collection, and to burn such as appeared of no interest. Amongst them were very many letters of the highest compliment, and some of kind advice from anonymous writers, or declared friends, pointing out, on his commencing lecturing at the Institution, what was considered faulty in his manner, and even in his pronunciation. But they were most commonly of a laudatory kind; and of this kind were several copies of verses, written in female hands, showing that he had excited no ordinary interest in their breasts, and that their admiration was of a very exalted kind. Yet all the praise that was betowed, all the delicious flattery which he received, and which might have spoiled the best disposition, and seduced from the path of exertion to luxurious repose, or dissipation in the circles of fashion, seemed to have been either wasted on his mind, and to have made no impression, or to have acted as a spur to continued exertion; and he never laboured harder, or exerted himself more successfully, than at the time he received most court, and apparently indulged most in the pleasures of luxurious society.

On this point, he thus expresses himself in a letter to his friend Mr. Poole, written in May, 1803: "Be not alarmed, my dear friend, as to the effect of worldly society on my mind: the age of danger has passed away. There are in the intellectual being of all men paramount elements,—certain habits and passions that cannot change. I am a lover of nature with an ungratified imagination. I shall continue to search for untasted charms, for hidden beauties. My *real*, my *waking* existence, is amongst the objects of scientific

research. Common amusements and enjoyments are necessary to me only as dreams to interrupt the flow of thoughts too nearly analogous to enlighten and vivify."

In the disposal of his time, he was far from systematic, directed rather by circumstances than guided by any precise rules. When in town, he generally entered the laboratory after breakfast, about ten or eleven o'clock, and, if uninterrupted, remained there till three or four. He seldom visited it before breakfast; and rarely after he had dressed for dinner.

His way of living during this period was of the most easy kind. Except when preparing a lecture, as already mentioned, he seldom dined in his apartments at the Institution: his invitations to dinner amongst his friends were so numerous that he was, or might have been, constantly engaged; and after dinner he was much in the habit of attending evening parties, devoting the evening to amusement; so that, to the mere frequenters of such parties,<sup>u</sup> he must have appeared a votary of fashion rather than of science. When his pursuits did not keep him in town, he often made short visits to friends residing in the neighbourhood of London, or went to some trout stream, of which there are so many good ones within twenty or thirty miles of the metropolis, and breathed the fresh air by the river side, and enjoyed the country and his favourite exercise and amusement of fishing together.\*

And during the vacations, when he had some months'

\* If confined in London longer than usual, and deprived of his favourite amusement of angling, he not unfrequently, as a relaxation, would turn to his fishing tackle, and look over his fly-book and assort the gaudy materials for making flies; and I very well recollect the effect on his mind was always refreshing.

leisure, he commonly made longer excursions. At different times he explored most parts of Great Britain, including even the distant parts of Scotland, and the Hebrides; and more than once he travelled through Ireland. His object in these journeys, was partly amusement and the acquiring of general information, and partly the study of the geological structure of the kingdom, and the phenomena of rock-formations in relation to geology as a science, and partly the collecting of agricultural knowledge. He made sketches of remarkable features of rock-scenery, and of peculiarities in their appearance; and he collected specimens of rocks, and minerals, and soils, which were deposited on his return in the museum of the Institution, or in its laboratory for examination. When he lectured either on the subject of geology or agriculture, he availed himself of them, and of paintings made from his sketches, which were not less serviceable in illustrating his descriptions and doctrines than the specimens of rocks and minerals themselves. His power of extracting information was great; it was constantly employed in these excursions, and I believe gave a strong idea of talent and capacity to comparatively uninstructed men. I recollect going through a mine, when I was a boy, with an intelligent Cornish miner, who, two or three years before, had accompanied my brother; he said, he had never before met with a person so inquisitive, and who asked him so many searching questions; and, from the manner in which the miner made the remark, he was evidently surprised as well as pleased at the deep interest he took in mining affairs.

Thus spending his time, admired and highly popular as a lecturer, courted in society for his genius and agreeable conversation, and in the highest estimation as



a man of science, with a happy sanguine disposition, and a capacity for enjoyment equal to his ample means, —he possessed an uncommon degree of happiness, a larger proportion than any one has a right to expect, and a far greater than the majority of mankind ever enjoy. I have, even now, after the lapse of thirty years, a very pleasing and vivid recollection of his cheerful and buoyant spirit, as well as of his extraordinary activity and energy. When I resided with him at the Institution, between 1808 and 1811, my bed-room adjoined his, and our beds were only separated by a wainscot partition. In going to bed, and rising, and sometimes in the dead of night, I used to hear him, in a loud voice, reciting favourite passages in prose or verse, or declaiming some composition of his own, or humming some angler's song.

His scientific labours, whilst he was at the Royal Institution, I shall very briefly advert to. The whole period of time, comprising about eleven years and a half,—namely, from January, 1801, when he first took up his abode in London, to April, 1812, when he retired from the Royal Institution on his marriage,—may conveniently be divided into two portions; the earlier one, terminating with his great discovery of the decomposition of the fixed alkalies,—the result and reward of his electro-chemical researches;—the latter, in the re-establishment of the simple nature of chlorine, —in a doctrinal point of view, not less important.

During the first portion of the period, amongst a great variety of objects of research, his attention was more particularly directed to the following:—First, The investigation of astringent vegetables, in connection with the art of tanning: Secondly, The analysis of rocks and minerals, in connection with geology:

Thirdly, The comprehensive subject of agricultural chemistry: and Fourthly, Galvanism, and electro-chemical science, which, chiefly under his cultivation, sprang from galvanism.

Soon after his arrival at the Royal Institution, at the suggestion and by the desire of the managers, he gave his attention to tanning, with a view to the improvement of the practical part of the art. He entered upon the investigation with all his usual ardour; visited tanneries, cultivated the acquaintance of practical tanners (in one of whom, Mr. Purkis, he had the good fortune to find a sincere friend, as well as an enlightened man), and made a large number of experiments in the laboratory. Indeed, the interest he took in the pursuit could hardly have been keener had he made it his profession. This is expressed in a lively manner in the following passage of a letter to his mother. He says, "I saw Mr. William Bolitho and his two brothers-in-law yesterday, and they breakfast with me to-morrow. We are all fellows of the same craft; they are great practical tanners, and I am a theoretical one. By the bye, I have ascertained some facts relating to tanning, which I hope will be really useful."

The results of his inquiries in a collected form he communicated to the Royal Society in 1803, and they were published in the Philosophical Transactions for that year, with the title of "An Account of some Experiments and Observations on the Constituent Parts of certain Astringent Vegetables, and on their Operation in Tanning." It is a paper of much labour and minute research, and well deserving the notice, both of the scientific tanner, and of the chemical student entering upon the subject of animal and vegetable chemistry, and the application of them to the arts.

In this inquiry, directed to the improvement of a very lucrative art, as in all his other inquiries, he appears to have had no view to profit. One present, I believe, he had, not indeed in acknowledgment, but in proof of the able aid he gave the practical tanner; which was a pair of shoes, one made of leather tanned by oak-bark, in the old way, and the other by catechu, which he wore with much satisfaction, the catechu leather (the first that had ever been made) proving not inferior in quality to the oak-bark leather: for him discovery had a greater charm than gain; and he appears to have been of opinion, that he had done his duty when he had pointed out the application of a scientific truth or principle to the arts of life; well aware, to use an expression of Lord Bacon's, that "the applying of knowledge to lucre diverts the advancement of knowledge, as the golden ball thrown before Atalanta, which, while she stoops to take up, the race is hindered."

*"Declinat cursus, aurumque volubile tollit."*

About the same time that he entered upon the investigation of tanning, he also turned his attention particularly to agricultural chemistry, and made it the subject of experimental research; and such was the rapidity of his progress in this inquiry, that in 1802 he was solicited and engaged by the Board of Agriculture to deliver a course of lectures to its members "On the Connection of Chemistry with Vegetable Physiology."

His rapid advance in the science of agriculture, for so it may be called in connection with chemistry, is more surprising in appearance than in reality, and is not difficult of explanation. Even from childhood he was familiar with all the ordinary operations of farming; and probably even before he commenced the study of



chemistry, an interest had been excited in his mind towards agriculture, and he had become an observer. His father was of a speculative turn of mind, and fond of farming and gardening. He did not confine himself to routine methods in either, but made trials of new methods. Amongst other experiments of his, of which I have heard mention, was one of watering grass meadows slightly with sea water, the result of which appears to have been favourable. Trials of this kind could not fail to have excited my brother's curiosity. Moreover, the region in which he spent his early youth was well adapted to keep alive and to heighten this feeling. The shores of the Mount's Bay and the adjoining country exhibit an extraordinary variety of surface, and some very striking contrasts of appearance of barrenness and of fertility. There, in a very small space, may be witnessed, within view of each other, the moving sand, the stagnant marsh, the grass meadow, corn-field, orchard, garden, and heath-covered moor, with almost every variation of soil capable of being produced by intermixture of the clays resulting from the decomposition of granite, and the disintegration of "killas"\* with sea-sand, and the siliceous detritus of primitive rocks. In the same little space may be witnessed on one side the fertilising effects of substances derived from the sea, as shell-sand, sea-weed, and decayed fish, used as a manure; and, on the other side, the sterility consequent on the operations of mining, and how the products of the mines, in different forms, are poisonous to, and destructive of vegetation, whether in the state of rubbish scattered over the ground, or collected in heaps on the site of the mine appropriately called "deads," or suspended or dissolved in water, impregnating the adjoining streams, or rising in fume and

\* Varieties of clay-slate.

vapour in the operation of the extraction of tin and copper from their ores. The fertilising influence of one set of causes, and the deleterious effects of the other, are so well marked, that they must necessarily arrest the attention; and, to a person tolerably well conversant with the principles of chemistry, they are no mean elements for agricultural chemistry. When he left his native county, circumstances continued favourable for preserving in his mind a lively interest in agriculture—circumstances both of time and place. In relation to the latter, it is scarcely necessary to make any remark. In the rich valleys of the Severn and Avon, contrasted with the generally barren surface of Cornwall, he must have seen a striking exemplification of the productive powers of soil; and in the more enlightened system of husbandry, then coming into use in the midland counties of England, especially as regards rotation of crops, compared with the old fallow system, which still maintained its ground in his native county, he must have seen as strongly exemplified the resources of science, and its superiority over prejudiced and traditional art. This period of time was a very peculiar and critical one; enhancing the value of agriculture, and demonstrating its truly vital importance to the nation. A succession of bad harvests, and the closure of the ports of the Continent, in consequence of the war, together threatening famine, gave rise to unwonted exertions to oppose and prevent the apprehended evil, which were rewarded with eminent success, and afforded convincing proof of the capacity of improvement of our agricultural resources.

This was the exact period when his attention was called to the subject, when there was an unusual avidity for information; an unusual disposition to make new

trials, and adopt new methods; and to endeavour to convert farming, from a mere art of blind processes, which it was, and is still, too generally, into a rational system of science. And he was invited to promote this good cause by a body of the most enlightened and influential agriculturists of the country, who constituted the Board of Agriculture, and who exerted themselves, in a very spirited and patriotic manner, to collect and diffuse useful knowledge throughout the country.

The manner in which he followed his inquiries into agricultural chemistry was, as well as his object, very similar to that he employed in investigating the art of tanning; viz., the illustrating and improving the methods of art, by applying to them the principles of science. He witnessed and studied the operations of the practical farmer; he made himself acquainted with the various methods of agriculture; he reasoned on these, and made them the subjects of experiment; he examined different kinds of soil, ascertained their physical properties and chemical compositions; and investigated experimentally the nature of manures, and their effects in different states.

The results of these inquiries he communicated to the Board of Agriculture in the lectures which, for ten years successively, he delivered at its meetings; and which, when he ceased to lecture in 1813, he published at the request of the Board, with the title of "Elements of Agricultural Chemistry, in a Course of Lectures for the Board of Agriculture."

The manner in which this work has been received, and the number of editions through which it has passed, the translations of it that have been made into almost every European language, are the best proofs of its



merit, and of the general estimation in which it has been held. That it was far from a perfect work, no one knew better than the author himself. In criticising it in relation to his powers, the circumstances under which it was composed should be taken into account. To agricultural chemistry he devoted only a small part of his time; and that at a period when he was intensely occupied in researches in the laboratory, in a train of experimental inquiry and discovery to which it would be difficult to find a parallel, either in brilliancy or importance. "We feel grateful to him," observes a contemporary writer in the *Edinburgh Review*, "for having thus suspended for a time the labours of original investigation, in order to apply the principles and discoveries of his favourite science to the illustration and improvement of an art which, above all others, ministers to the wants and comforts of man."\* Moreover, at that time, agricultural chemistry had been very little cultivated; no principles had been established; few satisfactory experiments even had been made of a precise and scientific kind; and, in consequence, he was obliged to draw almost entirely on his own resources. It is not, therefore, surprising that he sometimes adopted an opinion which has since proved to be erroneous, and indulged in speculation which later research has not confirmed. Science is essentially progressive, and it can be perfected only by the labour of many individuals.

In connection with his geological inquiries he instituted very many experiments on the analysis of mineral bodies, abundant proofs of which are given in his MS. geological lectures; but he published little expressly on the subject; only two papers: one of them giving an

\* *Edin. Review*, vol. xxii. p. 253.

account of his analysis of Wavelite, and the other describing the use of Boracic Acid, as a substitute for potash, in the analysis of compound minerals. Both these papers appeared in the Philosophical Transactions for 1805. They are not uninteresting in the annals of analytical chemistry. His most important contribution to this department of knowledge was contained in his Bakerian Lecture for 1806, "On some Chemical Agencies of Electricity." In the concluding part of this lecture, he makes some very interesting observations on the influence of electro-chemical action in the economy of nature, and especially in the mineral kingdom, the correctness of which has been fully confirmed by the ingenious researches of M. Becquerel, and other inquirers.

His labours in electro-chemical science were the most important of all; it was his favourite subject, and almost unremittingly pursued, until brought to a most successful termination. The first year of the present century was remarkable for the great invention which bears the name of its author—the Voltaic pile or battery,—and for the accidental observation of the decomposition of water by means of it;—or, to express the fact simply, the separation of water under its agency into oxygen and hydrogen. This very remarkable effect of the pile of Volta, which Messrs. Nicholson and Carlisle had the merit of first noticing, impressed powerfully the mind of my brother. He saw in it the connection between galvanism and chemistry;—he expected that it might prove a link between the ponderable and imponderable substances; and even then he had prophetic warnings that it was a passage to a new world of discovery. He was at that moment intensely occupied in completing and preparing for publication

his researches on nitrous oxide. As soon as he was free from this labour, he entered on the new inquiry, and prosecuted it with an ardent zeal, of which the papers he published whilst at Clifton (five in as many months), are a proof, though less forcible than his notebook, in which a vast number of experiments are recorded either as *agenda* or *acta*, in rapid succession. On his arrival in London, he immediately resumed the inquiry on a more extended scale in the laboratory of the Royal Institution, and made it, as has been already mentioned, the subject of his first course of lectures; as it was also of his first communication to the Royal Society. His other labours,—those already referred to,—occasioned some interruption, though never, I believe, complete, to the train of his experiments. In the beginning of 1806, he entered again fully into the investigation, influenced so to do, by contradictory statements relative to the generation by galvanism of muriatic acid and fixed alkali from pure water; and shortly solved, not only this problem, but may be said to have laid the foundation of a new science, electro-chemistry,—which was to become a means for the farther extension of science and for the discovery of new and extraordinary facts.

His first Bakerian Lecture, “On Chemical Agencies of Electricity,” detailing the phenomena of electro-chemical decomposition and laying open its laws, was read to the Royal Society on the 20th of November, 1806; and on the 19th of November of the following year, his second Bakerian Lecture announced the successful application of the principles, and the amplest confirmation of his hopes in the discovery of the metallic bases of the fixed alkalies, substances which previously had never been decomposed, and consequently were considered as simple or elementary.



This discovery, it would appear from his MS. lectures, was made in the beginning of October; potassium on the 6th of that month, and sodium a few days after. It was effected by acting on moistened potash and soda, by means of several voltaic batteries combined,—one consisting of twenty-four plates of copper and zinc of twelve inches square, one of one hundred plates of six inches, and a third of one hundred and fifty of four inches.

The extreme delight which he felt, when he first saw the metallic basis of potash, can only be conceived by those who are familiar with the operations of the laboratory, and the exciting nature of original research; who can enter into his previous views, and the analogies by which he was guided, and can comprehend the vast importance of the discovery, in its various relations to chemical doctrine; and, perhaps, not least, who can appreciate the workings of a young mind with an avidity for knowledge and glory commensurate. I have been told by Mr. Edmund Davy, his relation and then assistant, now professor of chemistry to the Dublin Society, that when he saw the minute globules of potassium burst through the crust of potash, and take fire as they entered the atmosphere, he could not contain his joy—he actually bounded about the room in extatic delight; and that some little time was required for him to compose himself sufficiently to continue the experiment.

Never, perhaps, was a chemical investigation more intensely interesting than the one under consideration; and never, perhaps, in so short a time were so many new and surprising facts developed. The Bakerian Lecture in which they are described attests this most fully; it occupies forty-four quarto pages, and almost every page contains a new result. Notwithstanding it

was a first sketch, and relating to phenomena altogether new and marvellous, it scarcely required any after correction, excepting in that part which treats of the volatile alkali; and though it was written on the spur of the occasion, before the excitement of the mind had subsided, yet it bears proof only of the maturest judgment: the greater part of it is as remarkable for experimental accuracy as for logical precision. This is the more worthy of notice, as when he composed it he was in a feverish state,—the prelude to a severe attack of illness, which was very near proving fatal,—and his great apprehension was, that he should die before he had published his discoveries; in consequence of which dread, he applied himself the more unremittingly to the task of detailing them.

The exact cause of this illness, as well as its nature, was doubtful. In after life he expressed his persuasion that it was typhus fever; and that he had caught the contagion in one of the great prisons of the metropolis, Newgate, which, at a time when a contagious fever existed within its walls, he had visited, for the purpose of suggesting means for disinfecting it. His physicians, however, adopted a different view of his case, as I have learned from one of them, his esteemed friend, the late Dr. Babington, who considered the disease as the result of over-fatigue and excitement from his experimental labours and discoveries. Be this as it may, it was not only severe, but long protracted. He took to his bed about the 23d of November, and nine weeks after he was only just convalescent.

This was a golden period of his life; every circumstance, even his illness, seemed contrived to add to his popularity and fame. Had he been of the highest rank in society, greater attentions could not have been paid

him, more anxious inquiries could not have been made after him. When he was at the worst, his physicians reported his state concisely in writing, for the information of the many who called to ask. In a letter now before me, written to his mother on the 7th December, the reports of the preceding day are copied, made at eight in the morning, at noon, and at nine in the evening. His physicians attended him with the greatest assiduity, and in the most friendly and disinterested manner. Two of them, Dr. Babington and Dr. Frank, were previously his friends; Dr. Baillie,\* who was called in when his illness was most threatening, was not behind them in kindness, disinterestedness, and attention, of which ever after my brother had a grateful remembrance. The feeling which existed at this time towards him is displayed in a notice which was printed,—part of the Rev. Dr. Dibdin's Introductory Lecture on the opening of the Institution, on the 18th of January, 1808. It commences thus:—

“Before I solicit your attention to the opening of those lectures which I shall have the honour of delivering in the course of the season, permit me to trespass upon it for a few minutes, by stating the peculiar circumstances under which this Institution is now again opened; and how it comes to pass that it has fallen to me, rather than to a more deserving lecturer, to be the first to address you.

“The managers of this Institution have requested me to impart to you that intelligence, which no one

\* The disinterestedness of this eminent physician, a quality for which he was so much distinguished, was marked on this occasion by his returning to my brother (as he himself informed me) a fee of fifty pounds, accompanied by a very friendly note, to the intent that he could not act otherwise towards a man of science.



who is alive to the best feelings of human nature can hear without the mixed emotions of sorrow and delight.

“Mr. Davy, whose frequent and powerful addresses from this place, supported by his ingenious experiments, have been so long and so well known to you, has for these last five weeks been struggling between life and death. The effects of those experiments recently made in illustration of his late splendid discovery, added to consequent bodily weakness, brought on a fever so violent as to threaten the extinction of life. Over him it might emphatically be said, in the language of our immortal Milton, that

‘Death his dart  
Shook, but delayed to strike.’

“If it had pleased Providence to deprive the world of all *further* benefit from his original talents and intense application, there has certainly been sufficient *already* effected by him to entitle him to be classed among the brightest scientific luminaries of his country: that this may not appear to be unfounded eulogium, I shall proceed, at the particular request of the managers, to give you an outline of the splendid discoveries just alluded to; and I do it with the greater pleasure, as that outline has been drawn in a very masterly manner by a gentleman, of all others, perhaps, the best qualified to do it effectually.”

An outline is then accordingly given, and, in continuation, it is added,—

“These may justly be placed amongst the most brilliant and valuable discoveries which have ever been made in chemistry; for a great chasm in the chemical system has been filled up; a blaze of light has been

diffused over that part which before was utterly dark ; and new views have been opened, so numerous and interesting, that the more any man who is versed in chemistry reflects on them, the more he finds to admire, and to heighten his expectation of future important results.

“ Mr. Davy’s name, in consequence of these discoveries, will be always recorded in the annals of science amongst those of the most illustrious philosophers of his time. His country with reason will be proud of him, and it is no small honour to the Royal Institution that these great discoveries have been made within its walls ; in that laboratory, and by those instruments, which, from the zeal of promoting useful knowledge, have, with so much propriety, been placed at the disposal and for the use of its most excellent professor of chemistry.”

Dr. Dibdin continues :—

“ This recital will be sufficient to convince those who hear it of the celebrity which the author of such a discovery has a right to attach to himself ; and yet no one, I am confident, has less inclination to challenge it. To us, and to every enlightened Englishman, it will be matter of just congratulation, that the country which has produced the two Bacons, and Boyle, has in these days shown itself worthy of its former renown by the labours of Cavendish and Davy.

“ The illness of the latter, severe as it has been, is now, however, beginning to abate ; and we may reasonably hope, from present appearances at least, that the period of convalescence is not very remote.”

During his convalescence, which was rather long protracted, for he was not able to resume his duties as professor till the 12th of March (when he gave his first

lecture on electro-chemical science); his mind recovered its energies much sooner than the body; proofs of which occur in a note-book kept at this time. It commences "January 24th, in convalescence after a confinement of nine weeks by dangerous fever, with bilious attacks;" with "Hints relating to the new discoveries and experiments made by H. D.;" which are followed by his opinions "concerning the elements of bodies."

During his convalescence he also amused himself with finishing a poem which he had commenced some years before, and which he now had printed. The following is a copy of it, with the heading which he then gave it:—

WRITTEN AFTER RECOVERY FROM A DANGEROUS  
ILLNESS.

Lo! o'er the earth the kindling spirits pour  
The flames of life that bounteous Nature gives;  
The limpid dew becomes the rosy flower,  
The insensate dust awakes, and moves, and lives.

All speaks of change: the renovated forms  
Of long-forgotten things arise again;  
The light of suns, the breath of angry storms,  
The everlasting motions of the main.

These are but engines of the Eternal will,  
The One Intelligence, whose potent sway  
Has ever acted, and is acting still,  
Whilst stars, and worlds, and systems all obey;

Without whose power, the whole of mortal things  
Were dull, inert, an unharmonious band,  
Silent as are the harp's untuned strings  
Without the touches of the poet's hand.

A sacred spark created by His breath,  
The immortal mind of man His image bears;  
A spirit living 'midst the forms of death,  
Oppress'd but not subdued by mortal cares!



A germ, preparing in the winter's frost  
To rise, and bud, and blossom in the spring ;  
An unfledged eagle by the tempest toss'd,  
Unconscious of his future strength of wing.

The child of trial, to mortality  
And all its changeful influences given ;  
On the green earth decreed to move and die,  
And yet by such a fate prepared for heaven.

Soon as it breathes, to feel the mother's form  
Of orb'd beauty through its organs thrill,  
To press the limbs of life with rapture warm,  
And drink instinctive of a living rill.

To view the skies with morning radiance bright,  
Majestic mingling with the ocean blue,  
Or bounded by green hills, or mountains white,  
Or peopled plains of rich and varied hue.

The nobler charms astonish'd to behold,  
Of living loveliness,—to see it move,  
Cast in expression's rich and varied mould,  
Awakening sympathy, compelling love.

The heavenly balm of mutual hope to taste,  
Soother of life, affection's bliss to share ;  
Sweet as the stream amidst the desert waste,  
As the first blush of arctic daylight fair.

To mingle with its kindred, to descry  
The path of power ; in public life to shine ;  
To gain the voice of popularity,  
The idol of to-day, the man divine.

To govern others by an influence strong,  
As that high law which moves the murmuring main,  
Raising and carrying all its waves along,  
Beneath the full-orbed moon's meridian reign.

To scan how transient is the breath of praise,  
A winter's zephyr trembling on the snow,  
Chill'd as it moves ; or, as the northern rays,  
First fading in the centre, whence they flow.

To live in forests mingled with the whole  
Of natural forms, whose generations rise,  
In lovely change, in happy order roll,  
On land, in ocean, in the glittering skies.

Their harmony to trace ; the Eternal cause  
To know in love, in reverence to adore ;  
To bend beneath the inevitable laws,  
Sinking in death, its human strength no more !

Then, as awakening from a dream of pain,  
With joy its mortal feelings to resign ;  
Yet all its living essence to retain,  
The undying energy of strength divine !

To quit the burdens of its earthly days,  
To give to Nature all her borrow'd powers,—  
Etherial fire to feed the solar rays,  
Etherial dew to glad the earth with showers.”

Fortunately, his constitution received no permanent injury from the disease he had escaped ; and, in consequence, when his strength was restored, he was able to resume, with all his habitual ardour, the train of inquiry which had been so suddenly interrupted.

The prospects which now opened to him in chemical science were no less brilliant than extensive. It was difficult for the imagination to set limits to the decomposing influence of Voltaic electricity ; it seemed only necessary to increase the size of the battery to increase its effect ; and it was not too sanguine to suppose that no compound body would be able to resist its agency, and that, ere long, by its application, all the elements of bodies would be brought to light, and the principles of chemical science be established in an immutable manner. In the opening lecture of the first course which he gave after his recovery, on electro-chemical science, contrasting the past with the future, alluding to this power, he observes, “ In this it will be seen that Volta has

presented to us a key which promises to lay open some of the most mysterious recesses of nature. Till this discovery, our means were limited; the field of pneumatic research had been exhausted, and little remained for the experimentalist except minute and laborious processes. There is now before us a boundless prospect of novelty in science; a country unexplored, but noble and fertile in aspect; a land of promise in philosophy."

With these sanguine expectations he again took the field, and, through the enlightened liberality of the managers of the Royal Institution and its principal members, he was amply supplied with all necessary apparatus to accomplish his objects. During his convalescence a voltaic battery of 600 double plates of four inches square was provided, a combination at least four times as powerful as any that had been before constructed. This was placed at his disposal; and, as he remarks in the lecture last quoted, it was provided, "not so much for the purpose of exhibiting what was already known, what might be accomplished by more simple means, as for the end of new research, and with the hope of new discovery:" and not long after, when it appeared advantageous to have a battery still more powerful, one of 2000 plates was constructed without delay, through the munificence of a few individuals, for the service of science. Nor were the means of research even limited to this powerful instrument; another presented itself in the metallic bases of the fixed alkalies; which promised to be hardly less efficient; and, happily, a chemical process was soon discovered, by MM. Gay Lussac and Thenard, for obtaining these substances in large quantities, so as to render them perfectly available.



Of the novel and important objects of inquiry, and the zeal with which he followed them, some idea may be formed from the papers which he contributed to the Royal Society, from 1808 to 1812 (constituting the second portion of the period before alluded to), and which were published in the Philosophical Transactions. The following is a list of them:—

“Electro-chemical Researches on the Decomposition of the Earths; with Observations on the Metals obtained from the Alkaline Earths, and on the Amalgam procured from Ammonia.”—Read June 30th, 1808.

“An Account of some new Analytical Researches on the Nature of certain Bodies, particularly the Alkalies, Phosphorus, Sulphur, Carbonaceous Matter, and the Acids hitherto undecomposed; with some general Observations on Chemical Theory.”—December 15th, 1808.

“New Analytical Remarks on the Nature of certain Bodies; being an Appendix to the Bakerian Lecture for 1808.”—February, 1809.

“The Bakerian Lecture for 1809; on some new Electro-chemical Researches on various Objects, particularly the Metallic Bodies, from the Alkalies and Earths, and on some Combinations of Hydrogen.”—November 16th, 1809.

“Researches on the Oxymuriatic Acid, its Nature and Combinations, and on the Elements of Muriatic Acid; with some Experiments on Sulphur and Phosphorus.”—July 12th, 1810.

“The Bakerian Lecture for 1810, on some of the Combinations of Oxymuriatic Gas and Oxygen, and on the Chemical Relations of those Principles to Inflammable Bodies.”—November 15th, 1810.

“On a Combination of Oxymuriatic Gas and Oxygen Gas.”—February 21st, 1811.

“On some Combinations of Phosphorus and Sulphur, and on some other Subjects of Chemical Inquiry.”—June 18th, 1812.

I shall not attempt an analysis of these papers, or even a sketch of the most important facts and discoveries which they contain, relative to the decomposition of the alkaline and common earths,—the nature of ammonia and its elements,—the nature of sulphur and phosphorus:—I shall limit the few remarks I propose to offer, chiefly to his researches on the acids, and the development of his doctrines respecting chlorine.

Analogy had always indicated the compound nature of certain acids, which, up to that time, had resisted all attempts to effect their decomposition. These acids were the boracic, muriatic, and fluoric. In a former part of this work, it has been mentioned how he tried his youthful strength against them, and failed. He now returned to the enterprise, and, with the more powerful agents which he could bring against them, succeeded perfectly.

The obvious analogy was that founded on the dogma of Lavoisier, of oxygen being the acidifying principle; and that as acids, the composition of which was known, consist of bases and oxygen, so those of unknown composition likewise must.

With this guide he commenced his researches, and he soon had the satisfaction of proving its correctness in relation to boracic acid: acted on by the voltaic battery, it underwent decomposition; a brown matter collected at the negative pole, which proved to be its inflammable base; the same effect on it was produced by the action

of potassium, from the more powerful affinity of the latter for oxygen; and the result of analysis was confirmed by synthesis. By heating boron (as the inflammable base was called) in oxygen, it burnt, and was reconverted into boracic acid.

Here we have an instance of the beneficial effects of analogy aiding the discovery of truth, and the extension of science. In the inquiry which he instituted into the nature of the muriatic acid, we have a contrary instance how a plausible analogy may be false, and lead to error, and tend to shackle science, and prevent the advancement of knowledge; and how (as he himself remarks in an early lecture on chlorine) “in the physical sciences there are much greater obstacles in overcoming old errors than in discovering new truths; the mind, in the first case, being fettered, in the last perfectly free in its progress;”—in accordance with what Bacon says, that “if false facts in nature be once on foot, what through neglect of examination, the countenance of antiquity, and the use made of them in discourse, they are scarce ever retracted.”\* He entered upon the inquiry, not doubting the correctness of the analogy; not doubting that the muriatic acid gas, up to that time, had not been decomposed; that it probably contained oxygen as an acidifying principle united to some base; and that oxymuriatic acid gas (as chlorine was then called) is a compound of muriatic acid gas and oxygen loosely united.

His object was to obtain the supposed base of muriatic acid, to separate the oxygen it was supposed to contain, and insulate the substance of which he was in quest: all his attempts were ineffectual. Most perplexing and anomalous results occurred. To account for them on

\* De Augmentis Scientiarum, p. 6.



the old hypothesis, it was necessary to suppose that water is essential to muriatic acid gas ; and that muriatic acid, without water or oxygen, in brief, uncombined, had never been witnessed.

Arrived at this stage of the inquiry, he reviewed the subject in its details ; vigorously threw aside all preconceived notions, and came to the conclusion that oxymuriatic acid gas, according to the opinion of Scheele, who discovered it, is a simple substance ; and that it forms muriatic acid gas by its union with hydrogen.

From this point, the inquiry relative to oxymuriatic acid gas may be considered as having taken another and novel direction—a course which conducted to new researches, and brilliant and important discoveries, both in relation to the facts and doctrines of science.

As soon as he had satisfied himself of the above conclusion, that there was no evidence for the decomposition of oxymuriatic gas, that it required to be received as a simple substance, it was natural for him to inquire, to what class of bodies it belongs ; that is, to what other substances its properties are most analogous. By a careful examination of its properties, he inferred that it is more analogous to oxygen than to any other substance : thus, in its electrical relations, like oxygen, it is powerfully attracted by the negative pole of the voltaic battery ; in relation to heat and light, like oxygen, combustion is a frequent accompaniment of its entering into combination ; like oxygen, also, though not acid in itself, it forms acid matter by union with inflammable substances. He proposed, therefore, to class it with oxygen, as a supporter of combustion and an acidifying principle ;—using the terms, not in the original and strict acceptation as employed

by Lavoisier, but merely as convenient expressions in connection with classification, in the same manner as the term inflammable is applied to the bodies with which they unite, and in the act of uniting with which inflammation is produced.

This classification was productive of the best effects; it broke down a great barrier of doctrine that had in a manner been consecrated by the genius of Lavoisier; it did away with an exclusive principle of acidity and combustion; it dispersed a thick mist of prejudice through which chemists had been in the habit of viewing chemical phenomena; removed all obstacles to natural arrangement; and, as we shall see hereafter, led to a great extension of chemical science.

As the name, oxymuriatic gas, was totally inappropriate to the substance to which it was applied, whether considered in its composition or properties, it was necessary to discontinue it; and my brother proposed as a substitute for it that of chlorine, a name independent of speculation, derived merely from the colour of the gas. On the same principle of avoiding a speculative nomenclature, he proposed to designate the combinations of chlorine by the names of their bases with the termination *ane*; a proposition which, perhaps wisely, has not been followed, as it would have been very inconvenient in use, perplexing the mind like a short-hand character.

Having now given a brief sketch of these researches, I have nearly performed my task in relation to them. His views were readily adopted by the most eminent chemists of Europe; and, with a few exceptions, in less than two years from their promulgation, they were very generally received and taught in the schools. This was no more than might have been expected in an

enlightened age, considering the nature of these views, their simplicity, the facility with which they explained phenomena, the inducements they held out to further research, and the promise they afforded of further discoveries.

The only individual I need mention, who resisted with any pertinacity, and made a protracted defence of the old doctrine, was Mr. (afterwards Dr.) Murray, an ingenious lecturer on chemistry in Edinburgh, who, I believe, never gave up his early opinion, that chlorine is a compound of muriatic acid and oxygen; or, rather, his modified opinion, that it is a compound of oxygen and dry muriatic acid. In support of the old doctrine, he published a series of papers in Nicholson's Journal, which my brother delegated me to answer. The controversy, as most frequently happens, was conducted with unnecessary warmth and asperity; however, it was not unproductive of good. It brought the subject strongly before the philosophical public, and was probably instrumental in deciding the question sooner than if the new doctrine had encountered no active opposition. And, what was more important, it was the means of bringing to light two gases, which, till then, had not been known:—Euchlorine, a compound of chlorine and oxygen, which was discovered by my brother, in January, 1811; and Phosgene, a compound of chlorine and carbonic oxide, which I discovered the same year. Both these gases, there is reason to suppose, were present and acted in Dr. Murray's experiments, without his knowledge of the circumstance, and gave rise to results of a deceptive character. After an interval of thirty years, I have much pleasure now in looking back on this happy period of my life, when the whole of my time was devoted to chemical



studies and pursuits in their most interesting and alluring form ; and, I can never forget the lively interest my brother took in what I was doing. When I ascertained the existence of phosgene gas, he was out of town. On his return I related to him all the particulars, and I am quite sure he felt more pleasure than if he had made the discovery himself. I shall be excused, I trust, for mentioning this little incident connected with myself, as it tends to display his warm sympathy in the success of others.

To recur to his personal history ; in 1803, he was elected a Fellow, and in January 1807, one of the Secretaries of the Royal Society,—associated in office with those distinguished men, Dr. Hyde Wolloston and Dr. Thomas Young :—the latter in the capacity of Foreign Secretary,—the former of Senior Secretary. He held the appointment, annually re-elected, until 1812,—when he resigned it,—shortly after retiring from the Royal Institution, on his marriage. It was a situation peculiarly agreeable to him ; and the attainment of it, he justly valued as a great honour. The duties of it were equally suitable to his disposition, tastes, and pursuits. He delighted in friendly intercourse with men of science,—was happy to afford his aid whenever required, and was always ready to answer the letters of correspondents in matters of science, and promote that “ Philosophical Commerce,” “ the improving and enlarging ” of which, a great ornament of the Society, and one of its first secretaries, had so much at heart. “ This is my solicitude, that as I ought not to be unfaithful to those counsels you have committed to my trust, so also, that I may not altogether waste any minutes of the leisure you afford me : and thus I have made the best use of some of them, I could devise, to

spread abroad encouragement, inquiries, directions, and patterns, that may animate and draw in universal assistance."

"The *Great God* prosper you in the noble engagement of dispensing the true lustre of his glorious works, and the happy inventions of obliging men all over the world to the general benefit of mankind: so writes, with real affection,

Your humble and obedient Servant,

HENRY OLDENBURGH.\*

In this spirit, I believe, my brother was faithful "to those counsels" of the Society committed to his trust. Glancing over the volumes of the Transactions, I can find no secretary through whom so many papers were communicated.

If necessary, other proofs in confirmation might be offered:—I shall indulge myself in adducing only one,—the testimony of a very competent judge,—that of the late Dr. Henry, whose friendship was acquired chiefly in correspondence on matters of science, and more or less connected with the Royal Society. Referring to my brother's letters to him, remaining in his possession, he remarks in a letter with which he honoured me, whilst I was in Malta,—“They are chiefly dated about the years 1809, 1810, and relative to points at that time uncertain, but since determined by accurate experiments, such as the proportions of gaseous products obtained by the analysis of ammonia, &c. &c. Others relate to papers of mine, which have appeared in the Philosophical Transactions, or to casual matters, such as the introduction of strangers.

\* “Epistle Dedicatory” to the Royal Society, prefixed to the first volume of the Philosophical Transactions.

There is not, I regret say, any one of them which, if they were laid before you, could supply any materials for the work in which I rejoice to find you are now employed. To myself they have a value, however, arising solely out of personal consideration; from occasional, but short, passages expressive of esteem and regard, and of approbation of my conduct in one rather delicate matter ( \* \* \* ), and, therefore, I wish them to descend to those in whose remembrance I wish to live, as honourable memorials of your brother's friendship. If it were otherwise,—if they contained any thing that it would gratify the world to know,—that would illustrate the progress of your brother's pursuits, or develop the features of his truly original and creative mind,—I should feel justly censurable for withholding them. Even now, if you visit England (which I trust you will) at an early period, and before the publication of your work, you shall satisfy yourself that the view which I have taken is the true one; and they can, in that case, be replaced without risk among documents which I am desirous to leave in the possession of my children."

When he accepted the appointment of Professor of Chemistry in the Royal Institution, he laid aside, for a time, the study of the medical profession, and devoted himself exclusively to scientific research. Now that he had attained distinction as an original inquirer, and a great degree of popularity, especially in the higher circles of London society, he appears to have had it in contemplation to resume his professional studies, with the view to engage in medical practice as a physician. For this purpose he entered his name at Cambridge, and kept some terms there. He was probably induced to form this plan by a prospect of fortune, in a profes-



sional career, infinitely greater than he had any right to expect from the mere prosecution of science. From the latter he derived a competency, and little more; from the other, he might calculate on making an independence, and on acquiring means of his own for prosecuting his favourite pursuits. Moreover, I have little doubt, that with his sanguine temperament and enlarged views, he might at this time have anticipated discoveries in medicine, not inferior to those which he had already made in chemistry; flattering himself with the hope of becoming, in a double sense, the benefactor of his fellow-men. But science had too strong a hold on his affections to allow him to carry into effect this plan; and without any struggle, I believe, he gave it up: he must have been convinced, on reflection, that he could not have followed it successfully, in regard to fortune, without making an entire sacrifice of science.

He had previously declined an invitation to enter the church. Some of his powerful friends, especially the Bishop of Durham and Sir Thomas Bernard, as I have been well informed, were desirous he should do so, with the persuasion that his eloquence might be of efficient service in the cause of religion, and holding out to him the brightest prospects of preferment. He contented himself with giving his aid in the cause in connection with science, as is expressed in the following letter to Sir Thomas Bernard, which was published in a newspaper of the day, prefaced by some good remarks on the part of the editor, on the unfortunate and melancholy disunion between science and religion which had taken place in France.

“ Royal Institution.

“ MY DEAR SIR,

“ Many thanks for your kind letter, and for the

interest you take in my public labours. I am never more delighted than when I am able to deduce any moral and religious conclusions from philosophical truths. Science is valuable for many reasons; but there is nothing that gives it so high and dignified a character, as the means which it affords of interpreting the works of nature, so as to unfold the wisdom and glory of the Creator. Be assured, my dear Sir, that I shall lose no opportunity of making those deductions which awaken devotional feelings and connect the natural with the moral sense. And I hope my claims to your approbation, and to the approbation of men, who, like you, combine pious sentiments with noble and enlightened views, will not diminish, for it is very grateful to me."

During the period he continued to lecture in the Theatre of the Royal Institution, his popularity was constantly increasing, and the size of his audience kept pace with it. Latterly it was scarcely less than 1000. His lectures were so attractive, that had he chosen to have retired from the Institution, like his predecessor Dr. Garnet, and to have opened a course on his own account, he might probably have acquired a large income. But he had a greater pleasure in giving his support to an establishment which he considered useful to society, with which he associated his fame, and which, without his exertions at that time, would, it is probable, have had but a short-lived existence.

In consequence of his reputation and discoveries he was twice invited to deliver courses of lectures to the Dublin Society successively, in 1810 and 1811; and each time he was received not merely in a distinguished, but in an enthusiastic manner. On each occasion resolutions were passed on the part of the Society of a very

flattering kind, expressive of thanks and gratification,\* and the compliment was crowned by Trinity College, Dublin, conferring on him the degree of Doctor of Civil Law. In the following letter, written to his mother, after his arrival in Ireland, in 1811, previous to the commencement of his lectures, he gives a lively idea of the estimation and regard in which he was held.

“ Balina, Ireland, Oct. 24.

“ MY DEAR MOTHER,

“ I am safe and well, in a remote and beautiful part of Ireland, where I have been making an excursion with two of my friends.

“ I shall return to Dublin in two or three days, and shall be very glad to hear from you or my sisters there. I hope you are all well and happy.

“ I heard from John a few days ago; he was quite well and in good spirits.

“ The laboratory in Dublin, which has been enlarged so as to hold 550 people, will not hold half the persons who desire to attend my lectures. The 550 tickets issued for the course by the Dublin Society, at two guineas each, were all disposed of the first week; and I am told now that from ten to twenty guineas are offered for a ticket.

“ This is merely for your eye; it may please you to know that your son is not unpopular or useless. Every person here, from the highest to the lowest, shows me every attention and kindness.

“ I shall come to see you as soon as I can. I hear with infinite delight of your health, and I hope Heaven

\* 1170*l.* were voted him for the two courses,—400 guineas for the first,—750*l.* for the second.



will continue to preserve and bless a mother who deserves so well of her children.

I am your very affectionate son,

“ H. DAVY.

“ My kindest love to my sisters and aunts.”

When his lectures were concluded, he wrote to me to the same effect. In a letter, dated December 1st, he says,—

“ I have nearly finished my business here: my lectures have been received with the highest interest, and the tone of hospitality, kindness, and respect towards me is even higher, if possible, than last year.”

Never was he more intensely occupied than during the last two or three years he spent at the Royal Institution, owing to the highly interesting and important trains of inquiries which one great discovery after another opened to him. In August, 1809, writing to his mother, he says,—

“ At present, except when I resolve to be *idle* for health's sake, I devote every moment to labours which I hope will not be wholly ineffectual in benefiting society, and which will not be wholly inglorious for my country hereafter; and the feeling of this is the *reward* which will continue to keep me employed.”

Cuvier, in his eulogy of him officially made to the Institute, as a foreign member, referring to this period of his life, to his discoveries and reputation, said,—

“ Davy, not yet thirty-two, in the opinion of all who could judge of such labours, held the first rank among the chemists of this or of any other age.”

At this period he may justly be considered at the height of his popularity, and perhaps of his happiness. He had earned an unsullied and noble reputation; he

was loved and admired by friends, who had cheered him on in his career; he had hardly passed the prime of manhood;\* he was in possession of excellent health; he had open to him almost every source of ordinary recreation and enjoyment; and he had, besides, the unfailing pleasures derived from the active and successful pursuit of science. His letters written at this time, such as I have had an opportunity of consulting, strongly mark a happy contentment, as well as a very amiable and affectionate state of mind. I more particularly allude to those which he addressed to his mother and sisters, and to myself. After spending three years with him at the Royal Institution, we parted in the autumn of 1811; he to proceed to Ireland, and I to commence my medical studies in Edinburgh. Many years older, the interest he took in me more resembled that of a father than of a brother; and it is with peculiar pleasure I now reflect on his various kindnesses; my numerous obligations (many of which were delicately concealed at the time, as I have since learned from his correspondence with my mother); his valuable hints and generous encouragement in regard to my studies, leaving me free to follow the bias of my own mind; and his excellent advice in respect to my conduct, in which was always infused a native nobleness of sentiment, well adapted to stir up virtue in a young mind. In illustration of this, I shall give a portion of a letter which I received from him from Dublin. In relation to himself, I could have wished to have given the whole, it is so strongly expressive of his natural goodness and kindness of disposition, and of his high and delicate sense of moral rectitude, but it is too flattering in regard to myself; and even part of what I

\* In 1811 he was 33.

give is of this description, written by one who knew that the voice of praise is one of the strongest incentives to virtue, and that a certain degree of self-respect is one of the best securities against moral degradation.

“ Dublin, Oct. 15, 1811.

“ MY DEAR BROTHER,

“ I am just arrived, after a short passage; and I have just perused your letter. I shall enclose with this as many letters of introduction as a frank will hold. Mrs. Appreece has written to Mr. H. Mackenzie’s family, which she thinks the one in Edinburgh that will be most agreeable to you. Call and leave your name. You will easily find him. He is the author of the ‘Man of Feeling.’

“ I should not lay much stress upon the advice of a bad logician.       \*       \*       \*       \*

“ You must follow your own plans with respect to study.       \*       \*       \*       \*       \*

“ Pray do not care about the expense, if it adds any thing to the comfort or the respectability of your situation. If you could board in a respectable family, it would, I think, be best.

“ I will, if you like, send you 40*l.* a-year, in addition to what my mother sends you; and you may, if you please, consider it as a loan, which you shall repay when you are a rich physician.

“ My dear John, let no difficulties alarm you. You may be what you please. Trust me, I know what your powers are. Preserve the dignity of your mind, and the purity of your moral conduct. You set sail with a fair wind on the ocean of life. You have great talents, good feelings, and an unbroken and an uncorrupted spirit. Move straight forward on to moral and intellectual excellence. Let no example induce you to



violate decorum,—no ridicule prevent you from guarding against sensuality or vice. Live in such a way that you can always say, the whole world may know what I am doing.

“ I am, my dear John,

“ Your ever affectionate Brother,

“ H. DAVY.”

Soon after his return to London from Ireland, new prospects opened before him full of hope of happiness, as well as of increased power of usefulness. He had, during the preceding year, become acquainted with Mrs. Appreece, towards whom esteem gradually ripened into affection.

When their marriage was decided on, he thus wrote to my mother:—

“ MY DEAR MOTHER,

“ You possibly may have heard reports of my intended marriage. Till within the last few days it was mere report. It is, I trust, now a settled arrangement. I am the happiest of men, in the hope of a union with a woman equally distinguished for virtues, talents, and accomplishments. \* \* \* \*

\* \* \* \*

“ You, I am sure, will sympathise in my happiness. I believe I should never have married, but for this charming woman, whose views and whose tastes coincide with my own, and who is eminently qualified to promote my best efforts and objects in life. \* \* \* \*

\* \* \* \*

“ I am your affectionate son,

“ H. DAVY.”

With the same strong feeling he announced his marriage to me about the same time:—

“MY DEAR JOHN,

“Many thanks for your last letter. I have been very miserable. The lady whom I love best of any human beings has been very ill. She is now well, and I am happy. Mrs. Appreece has consented to marry me; and when the event takes place I shall not envy kings, princes, or potentates. \* \* \* \*

\* \* \* \*

“I am, my dear brother,

“Ever most affectionately yours,

“H. DAVY.”

The next letter was written on the eve of his marriage, and just after he had received the honour of knighthood:—

“Friday, April 10th, 1812.

“MY DEAR BROTHER,

“You will have excused me for not writing to you on subjects of science. I have been absorbed by arrangements on which the happiness of my future life depends. Before you receive this, these arrangements will, I trust, be settled; and, in a few weeks, I shall be able to return to my habits of study and of scientific research.

“I am going to be married to-morrow; and I have a fair prospect of happiness, with the most amiable and intellectual woman I have ever known.

“The Prince Regent, unsolicited by me, or by any of my intimate friends, was pleased to confer the honour of knighthood on me at the last levee. This distinc-

tion has not often been bestowed on scientific men ; but I am proud of it, as the greatest of human genius's bore it ; and it is at least a proof that the court has not overlooked my humble efforts in the cause of science.

“ I have discovered pure phosphorus acid (a solid body, very volatile) ; and a pure hydroposphorus acid, containing two proportions of water and four of phosphorus acid, and decomposing by heat into phosphoric acid and a new gas containing four proportions of hydrogen and one of phosphorus. I have made some curious discoveries (economical ones) on sulphuric acid. I shall give them in my next.

“ Pray address to me, Sir H. Davy, Beechwood Park, near Market St. Alban's.

“ Believe me, my dear John, I shall always take the warmest interest in your welfare and happiness, and will do every thing to promote your views. I shall have some ideas on your studies soon to communicate.

“ I am, my dear brother,

“ Most affectionately yours,

“ H. DAVY.”

This letter was followed soon after by the next, making me further acquainted with his plans, and giving assurance of his continued attachment to science, in reply, if I recollect right, to a hope to that effect which I expressed in congratulating him on his marriage : —

“ MY DEAR JOHN,

“ I told you I should come to the Highlands this summer, and I shall carry the plan into execution. I wrote to you to say this a few days ago. I addressed



my letter Edinburgh ; so that, possibly, it may be lying at the post-office.

“I trust I shall have the happiness of seeing you before the end of July; and that I shall see you well, improved, active, and happy.

“I communicated to you, in a former letter, my plans, as far as they were matured. I have neither given up the Institution, nor am I going to France ; and, wherever I am, I shall continue to labour in the cause of science, with a zeal not diminished by increase of happiness and (with respect to the world) increased independence.

“I have just finished the first part of my ‘Chemistry,’ to my own satisfaction, and I am going to publish my ‘Agricultural Lectures,’ for which I am to get 1000 guineas for the copyright, and 50 guineas for each edition, which seems a fair price. As I shall see you so soon, I shall not write about any matters of science.

“I shall bring you what I think you will consider an agreeable present,—copies of all your papers, twenty-five of each, as presents for your friends.\*

“I was appointed Professor (honorary) to the Institution, at the last meeting. I do not pledge myself to give lectures. Brande gives twelve.

\* \* \* \* \*

“If I lecture, it will be on some new series of discoveries, should it be my fortune to make them ; and I give up the *routine* of lecturing, merely that I may have more time to pursue original inquiries, and forward more the great objects of science. This has been for some time my intention, and it has been hastened by my marriage.

\* These were papers published in the Philosophical Transactions.

“I shall have great pleasure in making you acquainted with Lady D. She is a noble creature (if I may be permitted so to speak of a wife), and every day adds to my contentment by the powers of her understanding, and her amiable and delightful tones of feeling. God bless you.

“Believe me to be

“Your affectionate brother,

“H. DAVY.”

The first work alluded to, in the letter just given, as *his Chemistry*, was his “Elements of Chemical Philosophy,” published very soon after his marriage. It was in many respects peculiar. In the dedication to Lady Davy, he expresses the warm feelings of his heart, and gives assurance of his lasting devotion to science. It was written during the period of his courtship, which, as he states in the same dedication, was the happiest period of his life. It was commenced in the autumn, just before he set out for Ireland, was rapidly continued amidst the various distractions of his many different occupations and pursuits, and was printed as it was written. Almost as soon as he began writing, he began printing; no fair copy was made: the MS. was transferred sometimes the same day and hour from his pen to the press; and yet I am not aware that the work bears any material marks of hastiness, or of carelessness, or of any want of systematic arrangement, or of due keeping and proportion of its parts. Though rapidly composed, it was not, in fact, hurried; he was very careful in verifying results, taking nothing for granted; and thus, in a letter written to me in the winter of 1812, speaking of this undertaking, in which he was then engaged, he says:—“The time not

employed in lecturing or public occupation I devote to my book. I shall soon send you what I have done. I examine all results as I go on." His great facility arose very much from his mind having been prepared for it by his previous studies and researches, somewhat in the same manner as the hand of a great artist in design is for a fresco painting. Indeed, as a whole, it is rather to be considered an epitome of his own labours, and discoveries, and peculiar views, than what the title of *Elements* would indicate.

As he stated in the first edition, and repeated in the copy prepared for the second, it was his intention to have continued and completed the work. He also stated in the latter his intention of shortly giving to the public a distinct work, containing a detailed account of his labours in analytical chemistry carried on during the preceding twelve years. Whether he commenced a second volume of his *Elements*, or the work last mentioned, I am not sure; I believe not; I can find no traces of either of them. The intention, however, he never entirely relinquished; and had his life been prolonged, and his health permitted, I have no doubt he would have carried it into effect. Whilst he preserved his health, that is, from 1812 to 1826, other objects of original research and more pressing interest almost constantly had his attention; and, afterwards, when his health failed him, he found himself unequal to an undertaking which, whether the continuation of the *Elements of Chemical Philosophy*, or an account of his analytical labours, would have required a devotion of time, and attention, and exertion, incompatible with a valetudinary state.

Of all the materials of biography, perhaps, notebooks, kept solely for the use of the individual, are the



most valuable ; they are, as it were, the log-book and register of the mind, and are equally fitted to display its habits and powers. My brother's note-books are not an exception to this remark : hastily written, and irregularly kept, designed for no eye but his own, they are very characteristic of him, and of the pursuits in which he was engaged at the time they were kept. Belonging to this period, his note-books are rather less miscellaneous than those of any former or after time ; and principally, though not exclusively, relate to matters of science and philosophy, on which his mind was then most intent. Some selections from them may not be unacceptable to the reader. Of poetry there occurs but little besides what has been already given : two specimens may suffice ; one " On Athens," a fragment ; the other, " Lines addressed to a Young Lady on her Birthday ;" the one pouring forth his admiration of intellect, and the other his love of nature, blended with his love of intellect and beauty. It is right to observe that neither of these effusions appears to have had his attention after they were written ; at least I have not been able to find a fair copy of them :—

## TO ATHENS.

Oh, Athens ! child of elder glory,  
The first, the best, renown'd in story !  
From whom, amidst the births of time  
Sprang forth, immaculate, sublime,  
The love of letters, science glowing,  
And an holy charm bestowing  
On all the natural forms of things,  
Giving to the Muses, wings  
To raise them from the paths of pleasure,  
From orgies in the Lydian measure,  
Amidst dark Cyprian vineyards given,  
To the eternal light of heaven ;

To call them from the thoughts of error,  
 From superstition's midnight terror,  
 From the tyrant's gold-bought praise,  
 From whining parasitic lays,  
 To intellect's more wholesome food,  
 The magnificent and good;  
 From base and popular applause,  
 From judgment's foul unhallowed laws,  
 To that which, sacred and refined,  
 Flows from the eternal mind !  
 Knowledge that never can decay  
 (Exhaustless as the unfathom'd sea),  
 That to the ardent lover gives  
 That vital dew which each that lives  
 Absorbs, demands, with joy inhales,  
 Whether from the peaceful gales  
 Breathing o'er those happy isles,  
 Where Nature is profuse of smiles,  
 Or the keen north, whose fur-clad host  
 Ranged upon the Arctic coast,  
 Beneath the light of moon and star,  
 Wait the day-spring from afar,  
 And in their long and tedious night  
 In visions catch the solar light.  
 Athens ! the poet's darling theme,—  
 Athens ! the patriot's sacred dream,  
 Where luxury did a form assume  
 Which all the virtues might illumine,  
 Where Venus wore Minerva's plume ;  
 Warmed by whose beauteous charms the sage  
 Was youthful in the vale of age ;  
 Where woman lovely shone, supreme  
 Above the poet's loftiest dream,  
 And to philosophy had given  
 Elysium, and a mortal heaven.  
 She yielded not to gold alone,  
 Nor to Golconda's glittering stone :  
 She loved whatever could expand  
 The soul,—the beautiful, the grand :  
 Whatever Phidias had designed  
 Expressive of immortal mind,  
 Came to her fancy like the sound  
 Of mountain torrents murmuring round."

\* \* \* \* \*

## TO A YOUNG LADY ON HER BIRTHDAY.

Hail, loved one ! to thy natal morn !  
May every coming year adorn  
Thy mind with new-born charms and powers ;  
And never may the fleeting hours  
Tell thee of aught but happiness !  
May Nature, in her fairest dress,  
For thee frame flowery chaplets new  
Of roses fresh in matin dew !  
May every season of the year  
For thee some new delight prepare !  
In spring mature the rural scenes  
Of highland glens or pastoral plains.  
There, where the moon in parting day  
Sheds through the trees her trembling ray  
Upon the balmy moss beneath,  
Mayst thou the evening zephyr breathe  
And listen to the songs which move  
The plumed choristers to love !  
Or if the moonshine is not seen,  
May glow-worms light thee on the green ;  
Or the fair star whose tranquil ray  
Seems in the solar blaze to play,  
As if it fed upon its streams  
Of light, and caught its dying beams !  
When summer's suns in fervor glow,  
Then be thy haunt the mountain's brow,  
Where blue, amidst the brilliant sky,  
Its giant helms are lifted high  
Above the cloudy canopy,  
Which spreading like a sea of light  
In dappled colours fleecy bright,  
(As if a sudden fairy birth)  
At once commingle heaven and earth.  
When their rich dress the woods display  
And quicker wanes the tranquil day,  
Then mayst thou haunt the murmuring streams  
Fitted for poetic dreams !  
Where the cushat's mournful sigh  
Tells love's sweet season is gone by ;  
There mayst thou then in quiet slumbers



Frame some soul-awakening numbers,  
 Some melancholy musing high,  
 Breathing of immortality !  
 When slanting suns through snow clouds peep,  
 And Nature seems to sink in sleep,  
 Then may society impart  
 Its sacred influence to thy heart ;  
 Not the vain influence of the crowd,  
 Or sneering low, or laughing loud,  
 But that which from the wise and good  
 Flows pure as if in solitude !—  
 Creative, noble, free, and kind,  
 The light, the spirit of the mind.  
 And mayst thou, lovely woman ! give  
 Feelings which shall for ever live ;  
 The images by passion caught,  
 The eloquence which kindles thought,  
 Which strength to weakness can impart,  
 And rouse again the exhausted heart ;  
 Like the refreshing streams that flow  
 From Cotopaxi crowned with snow,  
 Wakening where Quito's plains expand  
 The dewy herb and odorous flower !  
 Oh never may the coming years  
 Be seen through gloom, or mists of tears,  
 But tinged with rainbow hues, and bright  
 As autumn's skies in evening light !  
 Or if a transient cloud should rise,  
 Soon may it glow with brilliant dyes ;  
 And, like the clouds that shed the dew,  
 And give the flowers a brighter hue,  
 May it a healing charm impart  
 To soften or to wake the heart !  
 No grief, no anguish mayst thou prove—  
 No care, unless it spring from love !

On the subject of religion, comparing the Christian with other religions, the following reflections are written in pencil, in a note-book kept in 1805 :—

“The notions delivered in the early systems of mythology with regard to a future state are vague,

obscure, and inadequate. The Cimmerian shades of Homer, or the Elysian fields of Virgil, present no high impressive pictures; to form them required only a distempered imagination; and the sufferings of the vicious in Tartarus were fitted perhaps to excite a certain degree of superstitious fear in weak minds: but the happiness bestowed on the heroic and the virtuous, in the Elysian shades, is of a nature too feeble and indistinct ever to have had a material influence on spirits of a nobler stamp. The pleasures of the good are represented as the mere shadows of earthly enjoyments; and no justly thinking man living under the system could have sacrificed the earth for the heaven, the present for the future, or have renounced one vicious inclination in consequence of his veneration for Jupiter, or his dread of the wrath of Pluto.

“In the religion of Mahomet, rewards and punishments are strongly and impressively inculcated. But the paradise of the Mussulman is a rude copy of an earthly garden of pleasure. The mere enjoyment of common sensual pleasure is made the ultimate and glorious destiny of the believer and the blessed; and the warrior who has shed his blood in battle in the cause of God and the Prophet, and the dervise whose body has fallen under the discipline of abstinence and continual penance, have each their similar portions of women and wine, and are supposed eternally happy in the society of virgins immortal and undecaying, amidst ever-verdant groves bright with eternal sunshine, and moistened by streams containing a beverage more delicious than the juice of the grape of Schiraz.

“The tendency of such contemplations must necessarily be to debase and enfeeble the character, and to imprint more deeply on the mind the lowest passions,

and the most brutal appetites. That religion which has the harmony of truth, on the contrary, must necessarily curb the senses, and exalt the spirit; and, in all its details, must appeal to the loftiest and most intellectual passions of our nature. In the Christian system, the pleasures as well as the pains of a future life, though inconceivably great, have yet their means and their end concealed in mystery. The indefinite, the strongest source of high interest, is perpetually called up in the mind—‘Eye hath not seen, nor ear heard, neither hath it entered into the heart of man to conceive the joys that he hath prepared for those who love him.’ Sublimity is the characteristic of the future state in the religion of Jesus. The highest degree of hope or of fear must be awakened by it. The objects are grand, indefinite; and they are therefore most perfectly calculated to occupy the faculties of a being whose capacity of mental enjoyment and suffering, of improvement and degradation, appears without bounds. Of all the religions which have operated upon the human mind, Christianity alone has the consistent character of perfect truth; all its parts are arranged with the most beautiful symmetry; and its grand effects have been constantly connected with virtuous gratification, with moral and intellectual improvement, with the present and future happiness.”

This, I may remark, is a fragment, stopping at the commencement of a new sentence,—

“The existence of a Supreme Being,” &c.

Relative to the extracts which follow, I need premise but little. Those of greatest length appear as if written in preparation for lectures, whilst the very short ones may be considered as thoughts noted down to be arrested in passing.



“For the human mind is always governed not by what it knows, but by what it believes; not by what it is capable of attaining, but by what it desires or fears. There had been no demonstration of the impracticability of alchemy. The cultivators of this delusive art were occasionally visited by splendid visions of immortality, of unbounded riches, of inexhaustible pleasures. Even their *failures* developed some unsought-for object partaking of the marvellous. The instruments of their experiments were *new*. They had produced fire from the mixture of cold liquids. They had discovered specifics for formidable diseases. They had dissolved the metals, and had produced from liquid mixtures copper, and silver, and gold. In an age of enthusiasm, it was not to be expected that they themselves should set limits to their powers. At a time when even comparatively enlightened men were believers in witchcraft and its charms; at a time when that science was the chief study which is improperly called metaphysics, and which is founded upon an abuse of words, and a substitution of unmeaning phrases for the names of things; at a period when Aristotle reigned, and was, as it were, a tutelary deity of every professor’s chair; at a time when magic was believed,—it could not be expected that the *alchemical professors* should be the reasoning sect of the age. We have seen their errors, and the present generation has gained by their mistakes. They had discovered a *light* capable of guiding them in that dark night of ignorance, but they mistook their path. The *light*, however, was not extinguished, and it became subservient to the ends and the views of the chemical philosophers. Let it be remembered that I am speaking of the *speculative alchemists*, such men as Helmont, Helvetius, and Slare; and not of those vain impostors

and projectors who made the few secrets of chemistry the means of popular delusion: not of those immoral adventurers who travelled through Europe imposing upon the credulous and the ignorant; promising every thing, performing nothing; pilfering from their dupes, offering them riches, and reducing them to poverty.

“It was the custom of these trading projectors to establish themselves wherever they were unknown; to promise to reveal the art of making the philosopher’s stone; to build furnaces; to rob their employers, under the excuse of the necessity of preparation; and, when the time was accomplished beyond which they were unable to deceive, to explode their apparatus, or set fire to the house, and escape in the confusion. It is against this vile sect, common in the days of Queen Elizabeth, that Ben Johnson directed the keen and admirable dramatic satire of ‘The Alchemist,’ and they were all akin to the projector:—

The doctor—the smoky bearded,—he  
Will close you so much gold in a bolt’s head,  
And in a turn convey in the stead another,  
With sublimed mercury that shall mount in the heat,  
And all fly out in fumo.

“The passions of these men were low, their purposes vile and inglorious. The *true alchemical philosophers*, on the contrary, had often sublime and elevated views. The idea of glory was continually present to them. To ameliorate the condition of humanity, and to support the interests of religion, were constantly held out as their objects. A spirit of unaffected piety generally animates their works; and faith, charity, and brotherly love characterised their association. Their credulity was the vice of their age; their errors were the errors natural to an infant science; but their industry was

unceasing, their *hopes glorious*, and their discoveries eminently useful.”

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“ At that time, when Bacon created a new world of intellect, and Shakspeare a new world of imagination, it is not a question to me which has produced the greatest effect upon the progress of society—Shakspeare or Bacon, Milton or Newton. Shakspeare, indeed, has entered with a power that can never be imitated into all the recesses of the human heart; has given infinite delight to all tastes and all conditions of society, and painted man, and enabled us to understand man. But the influence of these wonderful works is limited by the pleasure that they give; they, undoubtedly, often excite to actions of virtue, but their impression is like that of a dream. The object of poetry, whatever may be said by poets, is more to amuse than to instruct; the object of science more to instruct than amuse.

“ Milton, undoubtedly, has given great enjoyment to the imagination by his varied, noble, and heroical thoughts, and lofty and virtuous sentiments; but his influence has been comparatively little extensive. Different nations have different opinions; the most superb of his ideas cannot with justice be rendered into other languages, and his most exquisite pictures have some connection with locality. And even the taste is variable; the capricious and the mutable oppose themselves to any standard. The mixed mythology of religion of Tasso is more delightful to some than the pure machinery of Milton; the bewitching paintings of Shakspeare, in which nature appears as it really is, offends the Frenchman, who, in tragedy at least, demands the eternal, sententious and powerful declamation, and



requires even that the very servants should wear the buskin.

“In natural science there is one language universally intelligible,—the language of facts; it belongs to nature, and it is permanent as the objects of nature; it is the same to the citizen of Paris and of London. Whenever the name of Newton is pronounced, it is pronounced with reverence; the name of Englishman derives glory from it: it is scarcely possible to look at the heavens, and read the order which is now visible in them, without a sensation of gratitude to the great discoverer of their laws. With respect to the exertion of talent required in physical science, and in works of imagination, it is very difficult to estimate the comparative power, genius, and ability. The imagination, as it is called, which is merely the vivid but vague association of images with passion, is principally employed in the one; the reason, which is the association of images according to facts observed in nature, is the faculty exerted in the other: but feeling, and force, and strength, are required for both species of exertion. The power of the mind, in the fervour of poetical composition, flows like a mountain torrent,—sparkling, foaming, beautiful and grand; but passing principally over rocks, and nourishing only the solitary tree, or the flowers of its mossy borders. The energy of the understanding employed upon the development of the truths of nature has a calm and quiet progress; in its motion it is like the navigable river; it bears upon it ships; it waters a fertile country; and what it wants in beauty it possesses in benefit; what is deficient in rapidity is supplied in strength.”

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“The unequal division of property and of labour,

the difference of rank and condition amongst mankind, are the sources of power in civilised life, its moving causes, and even its very soul.

“And in considering and in hoping that the human species are capable of becoming more enlightened and more happy, we can only expect that the different parts of society should be more intimately linked together by means of philosophy and the arts; that they should act as the children of one parent, with one determinate end, so that no exertion should be lost, no power rendered useless. In this view we do not amuse ourselves with delusive dreams concerning the perfectability of the human species, the annihilation of labour, disease, and even death: but we reason by analogy from simple facts; we consider only a state of human progression, rising out of its present condition; we look for a bright day, of which we already perceive the dawn.”

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“The union of sentiment and feeling in the different parts of a people is always connected with immense advantages: it forms what may be called the national spirit, which is uniformly the source of happiness and prosperity, of independence and conquering energy.”

As in character with this sentiment, I shall insert a portion of a letter which he wrote in August, 1807, to Mr. Poole, relative to the times and his country:—

“The times seem to me to be less dangerous, as to the immediate state of this country, than they were four years ago. The extension of the French empire has weakened the disposable force of France. Bonaparte seems to have abandoned the idea of invasion: if our government is active, we have little to dread from a maritime war, at least for some time. Sooner or later,

our colonial empire must fall in due time, when it has answered its ends. The wealth of our island must be diminished, but the strength of mind of the people cannot easily pass away; and our literature, our science, our arts, and the dignity of our nature, depend little upon external relations. When we had fewer colonies than Genoa, we had Bacons and Shakspeares.

“The wealth and prosperity of the country are only the *comeliness* of the body, the fulness of the flesh and fat; but the spirit is independent of them: it requires only muscle, bone, and nerve, for the true exercise of its functions. We cannot lose our liberty, because we cannot cease to *think*; and ten millions of people are not easily annihilated.”

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“There is scarcely a more dangerous propensity than that of attempting universal literature; of being able to criticise all modern books. It increases the memory at the expense of the reason; it supplies the graces of conversation, without the labour of thought. When I peruse some of the descriptions of ancient Athens and Rome, I am forcibly reminded of some of the societies of modern London. I seem to see the *parasite* clothed in the robes of the moralist; the affable *jester* concealed under the gown of the sacred minister of religion. I see men renouncing the dignity of character, and the greatness of reputation—(picture of Athens, that all men were able to quote the modern poets—to tell an entertaining tale). It was *then* that the parasite and the jester assumed those robes which were worn by the moralist, the minister of religion, and the philosopher, and prostituted talents that might have been employed to noble purposes, with the hopes of gaining a smile from the idle and the



vicious, and a murmur of applause from the great and luxurious.”

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“The man of genius always feels more power than he is able to develope. His stores are too copious to be at once poured forth. He requires a great stimulus, and there is no stronger characteristic of superlative talents than their association with a contempt of the popular opinion. By the popular opinion, let it not be understood that I mean the decisions of taste, the general opinion of mankind made venerable by antiquity; but that opinion which is the vague result of caprice, fashion, and imitation—which is affected by novelty and quaintness; that opinion which prevails in literature as in dress,—which can give a momentary effect to the splendid, the brilliant, or seductive.”

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“We are falling into an error the very reverse of that of our ancestors, who compiled and put together every thing. We, perhaps, neglect facts too much; or at least, except in chemistry, we are not sufficiently attentive to the recording of facts. We are too fond of substituting literature for science, talents for information, and wit or brilliant elocution for accurate and deep research. Declamation is good where the foundations of science are established, but wretched and hurtful where these foundations are wanting.”

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“Science is more neglected in this than in any other age: men are too much taken up in attempting to produce the *minor arts*. The philosophical spirit is too much banished from all our forms and all our methods,—that spirit which Bacon has characterised as the germ of life in the sciences.”

“What is the end of our existence, if it be not to investigate the wonders of—to understand the works of God; to increase in intellectual power; to form the moral law upon an extended view of society; to enjoy the sublime pleasures of reason and imagination? As the eye has been made to be delighted with the forms of beauty, the ear with sweet sounds, has the understanding, the peculiar attribute of man, no objects of delight, no enjoyments? Yes; it is the discovery of *truth*, the contemplation of the universe, the sublime pleasure of understanding that which others fear, and of making friends even of inanimate objects; to look back to the origin of things, and to the fate of our globe; and to consider those laws which create and destroy, and which, acting in infinite space, upon innumerable worlds, display the one intelligence of one mind.”

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“Experiments, even apparently the most trifling, can hardly fail to be useful;—so likewise all insulated systems and partial theories. The labours of the alchemists which were instituted in search of *visions*, led to the most important *discoveries*;—errors have been the foundations of some of the most perfect and beautiful of our methods,—and that fable which Æsop applied as the eulogium of industry,—of the dying father, who informed his sons of a treasure hid in his field, with a view to make them plough up the soil so as to increase its fertility, is admirably applicable to the present times.”

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“If, however, we relinquish wholly speculation and the pursuit of analogies, we do not at all fulfil the end of philosophy:—the most sublime end of the sciences is

that of discovering the laws of nature. But our hypotheses should be formed with rapidity, applied with ease, and eternally varied; they should be the instruments of thought,—the secret amusements of the mind; but truth only should be brought to light. The *phantasmagoria* representations of the intellect ought to find no place in our systems of philosophy.”

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“The grandest as well as the most correct views are those that have been gained by minute observation, and by the application of all the more precise and accurate methods of science.”

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“The light from the sun is too bright for our organs, till it is reflected from the earth. Divine truth requires to be made human truth before it can be relished by us.”

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“A man should be proud of honours, but not vain of them.”

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“Nothing can be more ridiculous than the attempt to find the discoveries of the moderns in the works of the ancients,—it is to look into the Eastern clouds to discover the light of the mid-day sun.”

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“Too much has been always concealed in the methods of the sciences;—the true Architect ought not only to be able to form the plan of his building, but likewise be acquainted with the scaffolding essential to the edifice.”

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“That light which at first overpowers our organs



becomes, under the influence of habit, the language of the external world ; so it is with science.”

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“The brood of the eagle, like that of the bird of night, is at first dazzled and pained by the light of the sun : but the one will not cease to look towards it till they can rejoice in its splendour ;—the other uniformly avoid its glorious rays.”

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“The ancients were inferior to the moderns ; but if there had never been an Aristotle, it is most likely that there never would have been a Bacon. The Greek sages furnished the instruments by which they themselves were subdued ; and had not this been the case, we hardly know what modern science could have been. Every fact belonging to the history of the human intellect proves that the progress of society is a uniform progress, and one of which all the different parts are intimately connected together ; and, unless this had been the case, we, coming in at the extremity of the system, had done very little, perhaps even nothing.”

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“One of the greatest benefits conferred by experimental sciences is, that they have given the true progression to the mind ; they have appeared as a work begun, but not perfected. There is no spirit or feeling of imitation in them, which uniformly cramps the best energies of the mind ; but one desire for extending them : and *discovery* is the great stimulus to exertion, is the highest stimulus to inquiry ; and the title of *discoverer* is the most honourable that can be bestowed on a scientific man.”

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“The great use of practical science is discovery.”

*“My Opinions concerning the Elements of Bodies.*

“If the electrical energies of bodies be examined, oxygen, and all bodies that contain a considerable proportion of oxygen, appear to be *negative* ; hydrogen, the metals, and all combustible bodies, *positive*.

“Amongst the oxygenated bodies, all that are solid are non-conductors ; all the fluid ones are imperfect conductors. Sulphur, phosphorus, and diamond—sulphur and phosphorus contain hydrogen, most likely also the diamond ; and the compounds of hydrogen are generally non-conductors.

“A new phlogistic theory might be established, which would explain all the phenomena, as well as the antiphlogistic.

“Thus, as we know oxygen is a principle possessing negative electricity, and hydrogen positive ; and as all bodies assembling at the positive contain oxygen, so may all bodies assembling at the negative contain hydrogen ; and the electricity of oxygen and hydrogen neutralize each other when they are to each other as eighty-five to fifteen in weight.

“Every body considered as a simple combustible will, on this hypothesis, consist of hydrogen, in different quantities, united to different bases ; and these bases must be negative, but not sufficiently to neutralize the energy of the hydrogen.

“Now, when a metal or an inflammable becomes increased in weight by the action of air, it may be supposed to be owing to a triple combination of oxygen, hydrogen, and the basis, in which the neutralization of energy is more or less perfect according to the degree of oxygenation.

“When an inflammable substance is revived by the action of heat or hydrogen, the hydrogen combines, and oxygen (as in the case of mercury acted on by heat) or water is expelled (as in the case of the revival of metallic oxides, in Priestley’s experiments by inflammable air.)

“When a metallic oxide is revived by charcoal, &c. the hydrogen of the charcoal displaces the water of the metal.

“When oxide of mercury is revived by charcoal, the charcoal retains its hydrogen, and the oxygen from the oxide combines with the compound to form carbonic acid; so that acids, oxides, and alkalies are all combinations of water with a metallic basis.”

#### “THIRD THEORY.

##### “*Extension and Improvement of the last.*”

“May not water, combined with two different imponderable principles, one acting the negative, the other the positive part, constitute oxygen and hydrogen? and may not these two ethereal principles be what some excellent electricians have called vitreous and resinous electricity? and may they not form fire by their attraction or neutral approximation? Then, whenever they were discharged, water would appear; and if they were discharged when one portion of water was in chemical union with other matter, there is no reason why the other portion, free from elastic matter, should not fix itself, which would account for oxidation.

“There are abundant analogies in favour of hydrogen changing the physical properties of the inflammable solids, and rendering them non-conductors.



“A minute portion in weight of the basis of potash, *i. e.*  $\frac{1}{50}$ , solidifies mercury, and the heat produced by their union is intense. There may not exist  $\frac{1}{1000}$  part of hydrogen in diamond, and yet it may be adequate to explanations. Charcoal seems to be non-conducting when it does not contain  $\frac{1}{100,000}$  part of its weight of hydrogen.

“If we suppose water *simple*; then,

“Oxygen will be water —

“Hydrogen, water +

“The metals, .. Unknown bases, water +

“Charcoal,

“Sulphur,

“Phosphorus,

“Nitrogen.

} Unknown bases, water +

“Acids, oxides, alkalies, and earths. } Unknown bases, water —.

“In this theory all the elements, except water, are supposed *x* and *y*.”

## CHAPTER IV.

Habits after his marriage, and devotion to science—His first visit to the Continent—His researches on Iodine—Brief characters of some of his Contemporaries—Verses written in travelling—His scientific labours in Italy—Extracts from his Journal in the Tyrol in 1814 and 1815—Anecdote from Sir Walter Scott—Return to England—Researches on Fire-damp, and discovery of a Safety Lamp—Public dinner at Newcastle, and acknowledgments in 1817—Extracts from his note-books on various subjects, philosophical, political, religious—His second visit to the Continent—His journal of an excursion into the Tyrol—Verses written on the Baths of Lucca—Notice of further scientific labours abroad and at home.

ALMOST immediately after his marriage he resumed his habits of research; and, indeed, followed, as far as change of circumstances from his single state would admit the same tenor of life as before.

In the June following he gave proof of his uninterrupted zeal in the cause of science, by a paper which he then communicated to the Royal Society, entitled, “On some Combinations of Phosphorus and Sulphur, and on some other Subjects of Chemical Inquiry.” And even when he set out on a tour of pleasure with Lady Davy, in the next month, for the Highlands of Scotland, he was provided with a portable chemical apparatus, that he might not be without the means of following his favourite pursuit of experimenting, in connection with fishing and shooting, which he almost as much delighted in. It was his intention to have re-

turned to London in December, but a letter which he received from Paris, from M. Ampere, mentioning a discovery which interested him much, viz. a new detonating compound of chlorine and azote, I believe, induced him to retrace his steps earlier. Be this as it may, in the latter end of October, he was again in the laboratory, and intent on the preparation of the new compound, of which he had only received from his correspondent the brief intimation that it was a fluid, exploding at the heat of the hand, and that it had deprived M. Dulong, the author of the discovery, of an eye and a finger.\*

The following is a paragraph from a letter which I received from him at this time, relative to this and other inquiries:—

“There is nothing doing here. I have commenced some experiments. I am attempting to decompose hydro-fluoric acid by chlorine, and to combine azote from prussic acid with chlorine. I heated this day diamond powder in chlorine, but there was no action.”

In another paragraph of the same letter, alluding to some experiments which we had made together in Edinburgh, in the laboratory of Dr. Hope, in the presence of that gentleman and some other men of

\* The following is the passage above alluded to:—“Vous avez sans doute appris, Monsieur, la découverte qu’on a faite à Paris, il y a près d’un an, d’une combinaison de gaz azote et de chlore, qui a l’apparence d’une huile plus pesante que l’eau, et qui détonne avec toute la violence des métaux fulminans à la simple chaleur de la main, ce qui a privé d’un œil et d’un doigt l’auteur de découverte. Cette détonnation a lieu par la simple séparation de deux gaz, comme celle de la combinaison d’oxygène et de chlore;—il y a également beaucoup de lumière, et de la chaleur, produite dans cette détonnation.”

So little communication was there then between England and France, owing to the war, that almost incredible as it may now appear, this was the first intimation received of this discovery.



science, on the union of muriatic acid gas and ammonia, in connection with the controversy then going on respecting the nature of oxymuriatic acid gas, between Dr. Murray and myself, he says:—

“I think you should answer Murray’s assertion by a short note, with testimonials. The controversy is closed.” He concluded this letter with the cheering exhortation, “Go on and prosper in all good things,—in usefulness, happiness, and knowledge.”

I shall insert the next letter I had from him entire, announcing his success in making the fulminating compound he was in quest of, and the wound he had received in his eye from its explosion, written, as Lady Davy added in a postscript, to save me from anxiety:—

“London, Nov. 16, 1812.

“MY DEAR JOHN,

“I have discovered the mode of making the combination of azote and chlorine. It is by exposing chlorine to a very weak solution of ammonia, or to a solution of nitrate of ammonia, or of oxalate of ammonia.

“It must be used with very great caution. It is not safe to experiment upon a globule larger than a pin’s head. I have been severely wounded by a piece scarcely bigger. My sight, however, I am informed, will not be injured. It is now very weak. I cannot see to say more than that I am,

“Your very affectionate brother,

“H. DAVY.”

This accident happened at Tunbridge, in Mr. Children’s laboratory; and, as a caution to others, on his

return to town, which was immediate, he communicated the particulars to the Royal Society, in a letter to Sir Joseph Banks. The injury of his eye was severe, and for a considerable time prevented him from prosecuting his labours of research. Thus, in a letter dated Wimpole, January 17th, 1813, where he was spending a few days at Lord Hardwicke's, he writes me:—

“I have had another severe attack of inflammation in the eye, and was obliged to have the conjunctiva and cornea punctured. I suspect the cause was some little imperceptible fragment. I am just recovering, and hope I shall see as well soon as with the other eye.

“My operations and employments have been, in a great measure, suspended; yet I have found opportunities of working a little upon fluorine. I believe I have nearly got to the bottom of this difficult question, and have expelled fluorine by chlorine, though I have not yet seen it, but I have ascertained that it expels oxygen from most compounds.

“I will give you my processes in my next letter.”

The complete recovery of his eye was protracted nearly till April, as appears from the following letter, descriptive of his plans and pursuits:—

“April 4, 1813.

“MY DEAR JOHN,

“It is long since I have heard from you. I am going into Cornwall. Pray address a letter to me, at Penzance. We are going, (a pretty large party) into the west, and shall fish in our way. I wish you were amongst us. I shall be absent from town about three weeks. We have come to the resolution of going to Scotland in the summer. Lady D. and I shall have the pleasure of seeing you there. We think of going by

Edinburgh, and of passing a good deal of our time in Sutherland; so that I have come to the resolution of seeing my mother and sisters in the spring. The Cornish journey will be too rapid a one, and too interrupted for Lady D. to be of the party. Blake, Warburton, Pepys, and the Sollys form a party who will combine mineralogy and fishing.

“I am now quite recovered, and Jane is very well, and we have both enjoyed the last month in London. I have been hard at work. I have expelled fluorine from fluuate of lead, fluuate of silver, and fluuate of soda, by chlorine. It is a new acidifier, forming three powerful acids; hydro-fluoric, silicated fluoric, and fluoboric. It has the most intense energies of combination of any known body, instantly combining with all metals, and decomposing glass. Like the fabled waters of the Styx, it cannot be preserved, not even in the ape’s hoof. We have now a triad of supporters of combustion.

“I have just finished printing my agricultural lectures. I shall send you a copy as soon as I can.

“Thenard has proved Lampadius’s liquor to be what Clement and Desormes thought,—carbon and sulphur, fifteen to eighty-five; nearly two proportions of sulphur to one of carbon.

“Remember me to Mr. Playfair when you see him, and to the Mackenzie family, and to the Fergussons. We hope to see Mr. Playfair in May. We shall see you, if all things do well, in July.

“I am, my dear John,

“Your most affectionate brother,

“H. D.

“Remember me to Mr. Moore. I want to try some



experiments before I write to him on his subject. Tell him this. Till within the last fortnight my eye has interfered with writing."

In the autumn of this year, finding it possible, on account of his scientific name, to obtain permission from the French government to visit the Continent, he formed a plan of an extensive tour with scientific objects in view, as well as the gratification of an ardent curiosity, and love of travel, which he soon carried into effect. The following is part of a letter which he wrote when on his way to embark at Plymouth:

Andover, Oct. 14, 1813.

"MY DEAR MOTHER,

"We are just going to the Continent upon a journey of scientific inquiry, which I hope will be pleasant to us, and useful to the world. We go rapidly through France to Italy, and from that to Sicily; and we shall return through Germany. We have every assurance from the governments of the countries through which we pass, that we shall not be molested, but assisted. We shall stay probably a year or two.


\* \* \* \* \*

"When I return I shall peacefully fix my abode for life in my own country.

"Your very affectionate son,

"H. DAVY."

The following day I had a letter from him from Plymouth; from whence, with Lady Davy, he crossed the channel in a cartel to Morlaix. He was accompanied by Mr. Faraday (who has since so honourably distinguished himself in original research) "as his assistant in



experiments and in writing,"\* and provided with a commodious portable apparatus for instituting such inquiries as he had in contemplation.

In Paris, to which he proceeded direct, he spent about two months, variously occupied between the calls of society and of science. During this short period he had the pleasure of being instrumental in adding another substance to the supporters of combustion, viz. iodine; the nature of which he first determined in a satisfactory manner. It had been discovered two years before by M. Curtois, a manufacturer of saltpetre, but kept a secret. About the time of my brother's arrival, MM. Clement and Desormes were engaged in examining it, at the desire of M. Curtois, and had ascertained many of its properties; and M. Gay Lussac had also entered on the inquiry. The most striking quality of iodine,—that by which it was discovered, and to which it owes its name,†—is its becoming a violet-coloured gas when heated. Another quality which fixed the attention of those who examined it was, its forming an acid having the character of the muriatic acid. M. Clement, indeed, believed that it was really the muriatic acid, and M. Gay Lussac entertained the same opinion. At the request of the former, my brother, who had received a small portion of the problematical substance from his friend, M. Ampere, submitted it to experiment, and soon satisfied himself that the acid just alluded to is distinct from the muriatic, and a new and peculiar one; and that iodine itself is a simple substance, analogous in its chemical relations to chlorine.

These views of the nature of iodine and its acid were communicated to M. Gay Lussac; and it was not till after this distinguished chemist was well acquainted

\* Mr. Faraday's words.

† From *ιωδης*, violaceous.

with them, and after further research, that he gave up his first idea.\*

The analogy between iodine and chlorine imparted to the former substance a peculiar interest, and very much facilitated the investigation respecting it. The contrast was great between the previous slowness and the subsequent rapidity of progress of the inquiry. In a few days my brother had ascertained some of its most remarkable properties and combinations, and had collected the materials of his first communication to the Royal Society on the subject; and in less than twelve months, chiefly in consequence of the elaborate and masterly researches of M. Gay Lussac, the chemical history of iodine was more full and complete than that of most other substances longest known.

Of his sojourn in Paris I have no particulars of any interest to communicate; he at this period kept no notes of what he observed,—nor, indeed, was it ever his practice in great cities. During his last illness he amused himself with writing or dictating notices of the distinguished men of science whom he had known. I shall here introduce a few instances of them,—a few of the most conspicuous and distinguished with whom he had the honour of becoming acquainted during his visit to the French capital,—most of whom, like himself, have paid the debt of nature. Slight as these sketches are, they may amuse the reader, as well as show my brother's perception of character, and the manner in which he estimated men.

“*Guyton de Morveau* was very old when I made his acquaintance, between seventy and eighty, and very feeble. Though he had been a violent republican, he was Bonaparte's director of the Mint, and a baron of the

\* Vide *Journal of Science and the Arts*, vol. i. p. 284.



empire. His manners were mild and conciliatory; and it is a proof of the energy of his mind, that, having promised his vote to a person as corresponding member of the Institute, he kept his promise, and my election wanted only his voice to be unanimous. Having never, when in France, inquired into the intrigues connected with elections, or interested myself about them, I should not have known this, had he not himself told me so when I dined afterwards at his house.”

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“*Vauquelin* was in the decline of life when I first saw him in 1813,—a man who gave me the idea of the French chemists of another age; belonging rather to the pharmaceutical laboratory than to the philosophical one: yet he lived in the Jardin du Roi. Nothing could be more singular than his manners, his life, and his ménage. Two old maiden ladies, the Mademoiselles de Fourcroy, sisters of the professor of that name, kept his house. I remember the first time that I entered it, I was ushered into a sort of bed-chamber, which likewise served as a drawing-room. One of these ladies was in bed, but employed in preparations for the kitchen; and was actually paring truffles. *Vauquelin* wished some immediately to be dressed for my breakfast, and I had some difficulty to prevent it. Nothing could be more extraordinary than the simplicity of his conversation;—he had not the slightest tact, and, even in the presence of young ladies, talked of subjects which, since the paradisaical times, never have been the objects of common conversation.”

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“*Cuvier* had even in his address and manner the character of a superior man;—much general power and eloquence in conversation, and a great variety of in-

formation on scientific as well as popular subjects. I should say of him, that he is the most distinguished man of *talents* I have known; but I doubt if he is entitled to the appellation of a man of genius."

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"*De Humboldt* was one of the most agreeable men I have ever known; social, modest, full of intelligence, with facilities of every kind: almost *too fluent* in conversation. His travels display his spirit of enterprise. His works are monuments of the variety of his knowledge and resources."

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"*Gay Lussac* was quick, lively, ingenious, and profound, with great activity of mind, and great facility of manipulation. I should place him at the head of the living chemists of France."

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"*Berthollet* was a most amiable man; when the friend of Napoleon even, always good, conciliatory, and modest, frank and candid. He had no airs, and many graces. In every way below *La Place* in intellectual powers, he appeared superior to him in moral qualities. *Berthollet* had no appearance of a man of genius; but one could not look on *La Place's* physiognomy without being convinced that he was a very extraordinary man."

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"*La Place*, when a minister of Napoleon, was rather formal and grand in manner, with an air of protection rather than of courtesy. He spoke like a man not merely feeling his own power, but wishing that others should be immediately conscious of it. I have heard, from good authority, that he was exceedingly proud of his orders, and that he had the star of the order of Re-

union affixed to his dressing-gown. This was in 1813. In 1820, when I saw him again, his master had fallen. His manners were altered. He was become mild and gentlemanlike; and had a softer tone of voice, and more grace in the forms of salutation. I remember the first day I saw him, which was, I believe, in November, 1813. On my speaking to him of the atomic theory in chemistry, and expressing my belief that the science would ultimately be referred to mathematical laws, similar to those which he had so profoundly and successfully established with respect to the mechanical properties of matter, he treated my idea in a tone bordering on contempt, as if angry that any results in chemistry could, even in their future possibilities, be compared with his own labours. When I dined with him, in 1820, he discussed the same opinion with acumen and candour, and allowed all the merit of John Dalton. It is true our positions had changed. *He* was now amongst the old aristocracy of France, and was no longer the intellectual head of the new aristocracy; and, from a young and humble aspirant to chemical glory, I was about to be called, by the voice of my colleagues, to a chair which had been honoured by the last days of Newton."

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"*Chaptal*, for a long while Bonaparte's minister of the Interior, was an active, amusing, intriguing courtier and chemist; and somewhat acquainted with the state of the chemical arts in France. Not very exact in conversation, and a little boasting, yet good-natured, and with lively manners and quick and ready conversation. More a man of the world than any of the Savants of his day in France. It is said that he was the author of Napoleon's decrees aimed at the commerce of England;



if so, he has contributed more than any other individual, except his master, to the military glory of the modern Briton."

These few sketches may suffice at present. He gave many more, both of foreigners and his countrymen, some of which will be introduced in the sequel.

In prosecution of his travels, he left Paris, on the 23rd of December, on his way to the south of France, and to Italy. Though he made no notes of this journey which remain, he has left some memorials of it, partly in verse, expressive of his feelings, and descriptive of certain spots and things which impressed him strongly, and partly in the results of scientific research. Some specimens of the former require a place here. The first I shall insert was written on the evening of the day he commenced his journey, and at Fontainebleau, after having witnessed the varied magnificence of forest and palace, under peculiar circumstances of time and season,—when an icy foliage covered the trees, and only a few months before the abdication of Napoleon, at this very place, of whose downfall, "never to rise," he had a presentiment, the expression of which, as he afterwards told me, he considered a prophecy.

" FONTAINEBLEAU.

" Dec. 29, 1813.

" The mists disperse,—and where a sullen cloud  
Hung on the mountain's verge the sun bursts forth  
In all its majesty of purple light.  
It is a winter's evening, and the year  
Is fast departing; yet the hues of heaven  
Are bright as in the summer's warmest month.  
It is the season of the sleep of things;  
But nature in her sleep is lovely still!  
The trees display no green, no forms of life;

And yet a magic foliage clothes them round,—  
 The purest crystals of pellucid ice,  
 All purple in the sunset. 'Midst the wood  
 Fantastically rise the towering cliffs,  
 That in another season had been white,  
 But now, contrasted with the brilliant ice,  
 Shine in aërial tints of purest blue !  
 The varied outline has a thousand charms ;  
 Here, rises high a venerable wood,  
 Where oaks are seen with massy ice girt round,  
 And birches pendent with their glittering arms,  
 And graceful beeches clinging to the soil ;  
 There, massy forms exist of rocks alone,—  
 Rising as if the work of human art,  
 The pride of some great Paladin of old,  
 In awful ruins. Nearer I behold  
 The palace of a race of mighty kings ;  
 But now another tenants. On these walls,  
 Where erst the silver lily spread her leaves—  
 The graceful symbol of a brilliant court—  
 The golden eagle shines, the bird of prey,—  
 Emblem of rapine and of lawless power :  
 Such is the fitful change of human things :  
 An empire rises, like a cloud in heaven,  
 Red in the morning sun, spreading its tints  
 Of golden hue along the feverish sky,  
 And filling the horizon ;—soon its tints  
 Are darken'd, and it brings the thunder-storm,—  
 Lightning and hail, and desolation comes ;  
 But in destroying it dissolves, and falls  
 Never to rise !”

The next, I believe, was written at Lyons, on first  
 viewing the distant Mont Blanc in the twilight from  
 the banks of the Rhone :—

“ MONT BLANC.

“ Jan. 5, 1814.

“ With joy I view thee, bathed in purple light,  
 Whilst all around is dark ; with joy I see  
 Thee rising from thy sea of pitchy clouds  
 Into the middle heaven,—

As if a temple to the Eternal, raised  
 By all the earth, framed of the pillar'd rock,  
 And canopied with everlasting snow!—  
 That lovely river, rolling at my feet  
 Its bright green waves, and winding 'midst the rocks,  
 Brown in their winter's foliage, gain'd from thee  
 Its flood of waters; through a devious course,  
 Though it has laved the fertile plains, and wash'd  
 The cities' walls, and mingled with the streams  
 Of lowland origin, yet still preserves  
 Its native character of mountain strength,—  
 Its colour, and its motion. Such are those  
 Amongst the generations of mankind  
 To whom the stream of thought descends from heaven,  
 With all the force of reason and the power  
 Of sacred genius. Through the world they pass  
 Still uncorrupted, and on what they take  
 From social life bestow a character  
 Of dignity. Greater they become,  
 But never lose their native purity."

"BANKS OF THE RHONE.

"Jan. 6.

"The air is soft as in the month of June  
 In northern climes; a balmy zephyr blows,  
 And nothing speaks of winter's harshest month  
 Save that the trees are leafless, and yon Alps,—  
 Not, as in summer, merely capp'd by snow,  
 But deep incased, and girt around by ice.  
 Upon the mountains crowded round thy banks,  
 O lovely Rhone! no ice, no snows are seen,  
 But lively tints and varied, such as might  
 Bespeak autumnal days. The oak, that long  
 Has kept its faded foliage, clothes thy base,—  
 The bracken to their sides a richer tint  
 Of chesnut gives, and the green herbage clothes  
 Their summits bathed in dew; save where the cliff  
 Uplifts its marble crest of hue diverse  
 And varied outline, grey with moss, or blue,  
 In native colouring; or, changed by time,  
 And rusted by the active elements,  
 More lovely in decay,—assuming forms  
 Of broken columns, and of mouldering towers.



Thy nearest banks, O lovely river ! glow  
 With the bright willow, round whose crimson buds  
 The water-fly expands her glittering wings.  
 Thy upper slopes the graceful myrtle skirts,  
 Green as in spring time ; and the primrose lurks  
 Beneath its odorous leaves. The fruitful vine  
 Darkens thy champaign, and on many a hill  
 The villages in sober colours rise,  
 The castles' towering walls ; and all the tints  
 Which human art bestows upon the scene  
 Are chaste as if the master-hand of Claude  
 Had traced upon the canvass their design.  
 From the deep gulleys bosom'd in thy rocks  
 Descend in foam and thunder many a stream  
 Without a name ; but one is far renown'd—  
 Sorgue,—beside whose crystal waters sang  
 The bard of Provence.”

The next lines are on a tree he much delighted in, the stone-pine, of Italy, which, wherever it occurs, is beautiful, whether solitary amidst the vine-clads hills bordering the Campagna of Rome, or collected in groves and forests, as in the Pineta of Ravenna :—

“THE MEDITERRANEAN PINE.

“Montpelier, Jan. 14, 1814.

“Thy hues are green as is the vernal tint  
 Of those fair meads where Isis rolls along  
 Her silver floods. And not amongst the snows,  
 Nor on the hoary mountain's rugged crest,  
 Is thy abode ; but on the gentle hill,  
 Amongst the rocks, and by the river's side,  
 Rises thy graceful and majestic form,  
 Companion of the olive and the vine,  
 And that Hesperian tree whose golden fruit  
 Demands the zephyr warmed by southern suns.  
 In winter thou art verdant as in spring,—  
 Unchangeable in beauty ; and thy reign  
 Extends from Calpe to the Bosphorus.  
 Beneath thy shade the northern African  
 Seeks shelter from the sunshine ; and the Greek,

In Tempe's vale, forms from thy slender leaves  
 A shepherd's coronal. Fanes of the gods  
 Of Egypt and of Greece majestic rise  
 Amidst thy shades ; and to the memory,  
 Oh lovely tree ! thy resting-places bring  
 All that is glorious in our history,—  
 The schools where Socrates and Plato taught,—  
 The rocks where Grecian freedom made her stand,—  
 The Roman virtue,—the Athenian art,—  
 The hills from which descended to mankind  
 The light of faith,—from which the shepherd gave  
 The oracles of heaven, and Israel saw,  
 The sacrificial offering of her guilt,  
 The blood of the atonement, shed in vain,  
 When Salem fell, and her offending race  
 Were scatter'd as the dust upon the blast."

The next verses are dated "Oriental Pyrenees,  
 January 26th." The record they contain of his strong  
 patriotic feeling and love of civil liberty was called  
 forth by seeing a British fleet in the Mediterranean,  
 and in anticipating the overthrow of a military des-  
 potism, which, had it prevailed, might, as he appre-  
 hended, have rendered Europe again almost barbarous:

"THE CANIGOU.\*

"MORNING.

"In the eastern sky the stars their lustre lose  
 In more diffused light, as if their orbs  
 Had melted into air, and form'd the day :  
 Above, the heavens receive a brighter tint  
 Of purest azure ; and beneath they glow  
 With lovely hues, which every instant change,—  
 Now purple and now orange ; and a gleam  
 Of golden light pours on the tranquil main.  
 I cast my eyes upon thy western coast,  
 And lo ! thy giant form, O Canigou !  
 As if a new creation of the day,

---

\* The Canigou is one of the highest mountains of the Pyrenees, nearly 9000 feet above the level of the sea (1491 toises).

Framed of the morning cloud for ever fix'd,  
 And gilded by the expiring morning star.  
 So bright thy glittering snows appear, they seem  
 To form another dawn : thy base is dark,  
 Rising through mists that mingle with the wave !

“ NOON.

“ The orb of light its flood of lustre pours  
 From the mid-heavens upon the tranquil sea  
 Without a tide, whose silver mirror spreads,  
 Reflecting forms of mountain-majesty  
 Along the Iberian coast ; and, more remote,  
 In gentle agitation feels the breeze,  
 That to its deep and lovely azure gives  
 The life of motion. All the morning mists  
 Have vanished, and the mid-day sunbeams sleep  
 Upon thy snows, or glitter where the streams  
 They feed with crystal waters pour in foam  
 Amidst thy dark deep glens and shaggy woods,  
 Where the bright pine and darker cork trees blend :  
 Their varied foliage forms a boundary  
 Where winter seems to mingle with the spring.  
 And lower still, the olive tree appears—  
 The work of culture, and the leafless vine,  
 And the green meadows, where the torrents sleep,  
 Or move obedient to the wants of man.  
 Nature in savage wildness—mountain strength,—  
 Breathes in one picture with the forms of art,  
 And all that stamp the social character.  
 A city's walls majestically rise,  
 The guardian of a realm whose sounds of war  
 Alarm the ear. Along the sandy shore  
 The path the Carthaginian trod appears,  
 When from the Pyrenees his veterans pour'd,  
 To try the strength of Rome, and shed profuse  
 Her patriot blood at Cannæ. On the wave  
 Triumphant ride the fleets of Ocean's Queen.  
 My heart throbs quicker, and a healthful glow  
 Fills all my bosom. Albion, thee I hail !—  
 Mother of heroes ! mighty in thy strength !  
 Deliverer ! from thee the fire proceeds  
 Withering the tyrant ; not a fire alone



Of war destructive, but a living light  
Of honour, glory, and security,—  
A light of science, liberty, and peace!

“ EVENING.

“ A moment past the sky was bright and clear,  
But now a mist obscures the ambient air ;  
The mist becomes a cloud, which gathers round  
Thy brow ; at first so white,—so bright, so pure,—  
The snows seem dark beneath its crisped fringe ;  
And now it spreads a thicker canopy,  
And rapidly descends, and fills thy glens,  
And covers all thy rocks. Its tints are changed,  
Its fleecy whiteness gone ; the sunbeams fade,  
And lose their glory in its sullen gloom,  
Portentous of the storm ! And now the rain  
Descends in floods—the angry lightning gleams,  
The thunder roars ; the tempest howls along  
Thy echoing cliffs ; and the vexed main  
Mingles her white foam with the troubled floods,  
The torrents from the mountains rolling down !”

The following lines on *Vaucluse* were written, I believe, in the beginning of February, when he visited the remarkable, beautiful, and impressive scene of which they are descriptive,—a scene in all its features, suited to his tastes and feelings, especially the river, which, of the purest water of the hue of the beryl, bursts from the base of a mountain precipice, and flows over a rocky bed covered with dark green *confervæ*, abounding in beautiful trout, which, probably owing to the perpetual coolness of the stream, are always in season\* :—

“ VAUCLUSE.

“ I see the rifted rocks above thy stream,  
O *Sorgue* ! and, as I trace its wave along,  
A scene of pastoral beauty glads my eye,  
Well suited to a pastoral poet's song ;—

---

\* On the 10th of April, 1830, I found the temperature of the *Sorgue* at its source 54°.

Meads that have gain'd their freshness from thy wave,  
And fed upon thy dews, whiten'd with flocks,  
And gentle slopes, where, 'midst the broken rocks,  
The vines spread forth their branches to the sun  
As if they gain'd their nurture from his beams ;  
And, in the richer soil, the olive turns  
Its glittering foliage from the northern blast.  
Along the hills the stately villa peers,  
Embosom'd deep in cypress. On the plain  
The cottages are spread, and many a row  
Of trees in formal trim the pruner's art  
Declare ; fitted to bear the richest fruits  
Pomona culls, or for the verdant food  
Of that fair insect, daughter of the spring,  
Whose industry supplies the Cimbrian looms.  
I walk along thy banks ;—and now thy streams  
Descend with more of power and sparkling foam.  
Amidst their basins awful cliffs impend  
Above thy channel, raised in many a form  
Fantastical of spires and Gothic towers  
And airy battlements ! As if in sport,  
Nature in humouring her plastic strength  
In playful mood had form'd them. In a dark  
And gloomy chasm, crowded with broken rocks,  
I see the white spray rise in many a cloud ;—  
And now I hear the thundering cataract.  
It is thy lofty spring, O wondrous stream !  
Born of the mountain snows ! Thy course is made  
In darkness and in silence, deeply hid  
Within thy channel of the marble rock !  
And all at once thou risest into light,  
Pure as if fresh from heaven ! Embosom'd long  
In earth, thou hast no earthly taint. Thy hues  
Seem stolen from the blue etherial sky,  
So bright, so pure their lustre ; and thy foam  
Is whiter than the snow that gave thee birth.  
In thunder thou descendest from thy rocks !  
Nor dost thou sleep beneath them ; murmuring still  
Along thy pebbly bed, garnished with plants  
Growing amidst thy waters, mingling hues  
Of emerald with thy transparent blue.  
I wonder not the poet loved thy wave,—  
Thy cavern'd rocks,—thy giant precipice ;

For such a scene was suited well to break  
 The tyrant-spell of love, and to controul.  
 A passion that was often hopeless love  
 Call'd for impressions strong and vigorous,  
 Such as this scene sublime might well bestow  
 Upon a mind alive to sympathy  
 With all created forms that bear the stamp  
 Of loveliness, or majesty, or grace."

The lines on Carrara, with which I shall conclude these poetical notices are without date; but I believe they were written at this time, when he visited this remarkable spot on his way to Florence.

" CARRARA.

- " Thine is no dark and dreary mine,  
 No hidden quarry damp and cold;  
 Thy crests in orient sunbeams shine,  
 The morning tints thy rocks in gold—
- " Thy rocks sublime, that still remain  
 As erst from chaos they arose,  
 Untouch'd by time, without its stain,  
 Pure as their canopy of snows!
- " Forms worthy of that magic art,  
 Which from the graver's potent hand  
 Can bid the hues of beauty start,  
 And all expression's power command;—
- " Forms worthy of that master skill,  
 Which to the poet's dream has given  
 The noble front, the potent will,  
 Fix'd in the majesty of heaven;
- " And that a softer charm has shed  
 On Cytherea's radiant head,  
 And kindled in her Grecian face  
 The immortality of grace!
- " Scenes blended with the memory  
 Of mighty works can well supply  
 The food of thought,—and scenes like these  
 Have other natural powers to please.



“Around transparent rivers flow,  
Whose tints are bright as summer sky;  
Upon their banks the olives grow;  
The greener pine, aspiring high,  
“Towers ’midst the cliffs; the chesnut loves  
Thy slopes, where vines their tendrils rear;  
In the deep glen the myrtle groves  
Embalm the cool and quiet air.”

I shall now briefly revert to his scientific pursuits—the main object of his travels. From Paris he went directly into Auvergne, and examined the extinct volcanoes of that mountainous region. From thence he proceeded to Montpellier, where he resumed his inquiries on the combinations of iodine; the results of which he communicated to the Royal Society in a paper, which was published in the “Philosophical Transactions” of the same year. He crossed into Italy by the way of Nice and the Col de Tende; and passing through Turin, proceeded to Genoa, where he remained a few days, and took the opportunity of making some experiments on the electricity of the torpedo, but without good results, probably partly owing to the languid state of the fish from the coldness of the season; and also of extending his inquiries on iodine. Both here and at Montpellier, in quest of this substance, he examined many of the marine productions of the shores of the Mediterranean, in most of which he found traces of it. But in the sponges, the ashes of which he tried, and bay-salt, he could not detect it.\* Since, however, it has been de-

\* If the sponges, the ashes of which my brother experimented upon, had been previous to incineration subjected to repeated washing, it may account for his not detecting iodine in them. I have found by this process that the greater part of the iodine is abstracted.

I may here add, that I have also detected slight traces of iodine in the coarse sea-salt of the Mediterranean, and which therefore I have been

tected by Dr. Fyfe in the former (*Edinburgh Philosophical Journal*, No. 2.); and, I may remark, that the results of my experiments on sponge are in accordance with Dr. Fyfe's; and thus confirming its important medicinal character and efficacy.

From Florence, where he arrived from Genoa in the middle of March, he wrote me the following letter, particularly referring to his scientific labours:—

“Florence, March 18, 1814.

“MY DEAR JOHN,

“I have written to you several letters, but I have not yet received one in return. This I attribute to the difficulty of communication, not to any want of kindness on your part.

“Write to me, *alla posta*, Roma. There is now full communication between Italy and England: and tell me all the news,—what you have done, what you have published, and what you are doing.

in the habit of recommending for use in families, and more especially in nurseries, in preference to refined salt. It is not improbable that the apparent increase of scrofulous and consumptive disease in recent times may be connected with the over refinement of salt,—that is, carried so far as to deprive it of its iodine principle, which seems intended by provident nature as a corrective of certain injurious causes productive of a terrible class of diseases. This view is confirmed by the remarkable difference in point of health in the population of certain mountainous districts of South America, as described by M. Boussingault in the 54th volume of the *Annales de Chimie et de Physique*, in some of which salt containing a very small proportion of iodine is used, and in others, salt entirely destitute of iodine. As regards the public health and the happiness of families, the subject is of the first importance, and deserving of minute and thorough inquiry. Tubercular pthisis now carries off about one-fourth of all who die in our own country,—the most interesting, and loved, and valued; hardly sparing a family. Its cure, when formed, is almost hopeless; its prevention is full of hope, and to this all our care should be given.

“I find the French chemists inclined to your views of animal heat, as a chemical process, and Le Gallois strongly opposed to Brodie; yet after much discussion, I have retained my opinion.

“We have made a most interesting voyage in eventful times. I have passed from the Pyrenees to the Alps, and have twice crossed the Appenines, and have visited all the most remarkable extinct volcanoes in the south of France. All the basalt that I have seen between the Alps and Pyrenees is decidedly of igneous origin. I have observed some facts on this subject that are, I believe, new,—a regular transition of lava into basalt, depending upon the different periods of refrigeration; and true prismatic basalt in the interior of an ancient lava.

“I have worked a good deal on iodine, and a little on the torpedo. Iodine had been in embryo for two years. I came to Paris; Clement requested me to examine it, and he believed that it was a compound, affording muriatic acid. I worked upon it for some time, and determined that it was a new body, and that it afforded a peculiar acid by combining with hydrogen, and this I mentioned to Gay Lussac, Ampere, and other chemists. The first immediately ‘took the word of the Lord out of the mouth of his servant,’ and treated this subject as he had treated potassium and boron. The paper which I sent to the Royal Society on iodine I wrote with Clement’s approbation, and a note published in the ‘*Journal de Physique*’ will vindicate my priority. I have just got ready for the Royal Society a second paper on this fourth supporter of combustion.

“The old theory is nearly abandoned in France. Berthollet, with much candour, has decided in favour of chlorine. I know no chemist but Thenard who



upholds it at Paris, and he upholds it feebly, and by this time, probably, has renounced it.

“I doubt if the organ of the torpedo is analogous to the pile of volta. I have not been able to gain any chemical effects by the shock sent through water; but I tried on small and not very active animals. I shall resume the inquiry at Naples, where I hope to be about the middle of May. In my journey I met with no difficulties of any kind, and received every attention from the scientific men of Paris, and the most liberal permission to go where I pleased from the government.

“I lived very much with Berthollet, Cuvier, Chaptal, Vauquelin, Humboldt, Morveau, Clement, Chevreul, and Gay Lussac. They were all kind and attentive to me; and, except for Gay Lussac’s last turn of publishing without acknowledgment what he had first learned from me, I should have had nothing to complain of; but who can controul self-love? It ought not to interfere with truth and justice; but I will not moralise nor complain. Iodine is as useful an ally to me as I could have found at home. Tell me what you are doing, and what you wish; and command me as your affectionate friend, and love me as your very affectionate brother,

“H. DAVY.”

At Florence, where he remained rather more than a fortnight, he entered upon a new subject of inquiry, which he prosecuted afterwards at Rome; viz. the nature of the diamond, and of the different varieties of carbon. The results he obtained, (indicating that diamond contains no new and peculiar principle, — that it is merely crystallized carbon, and that the common varieties of carbon are essentially the same, differing

only in state of aggregation and in containing some accidental impurities) went far to overthrow an opinion, which had almost become an axiom, and which he himself was disposed to adopt, "that bodies cannot be exactly the same in composition or chemical nature, and yet totally different in their physical properties."

In the beginning of April he quitted Florence for Rome; and, as I conjecture, took the Perugia road, which, to a traveller entering Italy for the first time, is much more attractive than the route by Radicofani. However, which of the two it was is of no importance; my only reason for believing that it was the former, is a description of scenery at this very season of the year, written from recollection some years after, with which he opens a chemical dialogue that was never completed. It thus commences:—

"SCENE—*The Appenines above Perugia.*

"*Poet.*—Notwithstanding the magnificence of the Alpine country, and the beauty of the upper part of Italy, yet the scenery now before us has peculiar charms, dependent not merely upon the variety and grandeur of the objects which it displays, but likewise upon its historical relations. The hills are all celebrated in the early history of Italy, and many of them are crowned with Etruscan towers. The lake of Thrasimene spreads its broad and calm mirror beneath a range of hills covered with oak and chesnut; and the eminence where Hannibal marshalled that army which had nearly deprived Rome of empire, is now of a beautiful green from the rising corn. Here, the Tiber runs, a clear and bright blue mountain stream, meriting the epithet of cerulean bestowed upon it by Virgil; and there, the

Chiusan marsh sends its tributary streams from the same level to the rivers of Etruria and Latium. In the extreme distance are the woods of the Sabine country, bright with the purple foliage of the Judas tree, extending along the sides of blue hills, which again are capped by snowy mountains. How rich and noble is the scene! How vast its extent! how diversified its colours!"

The subject of the dialogue is the chemical elements. He chose this beautiful and impressive scene, belonging to history, to contrast the constancy of nature with the mutability of man, preliminary to explaining the laws on which that constancy depends.

He remained in Rome nearly a month, and then went to Naples, where he spent about three weeks. He returned to Rome in the last week of May, and left it in the first week of June, with the intention of passing the summer in Switzerland.

It is hardly necessary to observe, that both at Rome and at Naples he found unfailing sources of interest, as every person of an inquiring and reflecting mind necessarily must,—where what is marvellous and beautiful in nature and art, of the past and of the present time, abound in such profusion, and occur in the most impressive forms. His last work, finished at Rome, his "Consolations in Travel," bear in almost every page indications of this interest, which even increased, I believe, in his after visits, and especially in his last, when, owing to his feeble state of health, ordinary sources of enjoyment were closed to him. The same work contains many allusions to the incidents of this time, or to the observations which he made during this or the following year. Thus, in the third dialogue, he mentions his



“safe passage through a party of brigands who once stopped him in the passes of the Appenines.” This occurred between Rome and Naples; and I have heard him say he had an amusing conversation in walking up a steep ascent of the road beyond Fondi with the captain of the party, who allowed him to pass unmolested, in compliment to his country. Thus, again, in the same dialogue, he describes the triumphant return from banishment and prison of the venerable Pontiff, Pius VII., and his entry into Rome, borne on the shoulders of the most distinguished artists, headed by Canova, which he himself witnessed.\* And it was at Rome, not at Fontainebleau, I believe, that he had an opportunity of paying his respects to the Pope, “whose sanctity, firmness, meekness, and benevolence, he considered an honour to his church and human nature.” It was during this period that he commenced those observations on volcanic action, and on the effects of deposition from water, which he has described in the “Consolations,” in connection with his peculiar views respecting the great changes which have taken place on the surface of our globe. And of the six dialogues, of which the whole of this work consists, the scenes of three of them are laid in Southern Italy; viz. in the Colosseum, on Vesuvius, and at Pæstum.

Amongst his note-books I can find but few remains which refer to this particular time. They are chiefly poetical, with a few notes on Somma. They may be worthy of insertion in further illustration of his tastes, feelings, and manner of observing.

The following lines to Canova, with whom he now became acquainted, and from whom he received great attention, could hardly have been written elsewhere

\* May, 1814.

than at Rome. Whilst they are a tribute to the excellence of the man and of the artist, they are no weak proof of my brother's admiration of the art.

“CANOVA.

“Thou wast a light of brightness in an age  
 When Italy was in the night of art:—  
 She was thy country; but the world thy stage,  
 On which thou actedst thy creative part.  
 Blameless thy life—thy manners playful, mild,  
 Master in art, but Nature's simplest child.  
 Phidias of Rome! like him thou stand'st sublime:  
 And after artists shall essay to climb  
 To that high temple where thou dwell'st alone,  
 Amidst the trophies thou from time hast won.  
 Generous to all, but most to rising merit;  
 By nobler praise awakening the spirit;  
 Yet all unconscious of the eternal fame,  
 The light of glory circling round thy name!”

The next lines are not less a tribute to nature, and a proof of the powerful influence which beautiful and impressive scenery was capable of exercising over his mind:—

“THE SYBIL'S TEMPLE.\*

“Thy faith, O Roman! was a natural faith,  
 Well suited to an age in which the light  
 Ineffable gleam'd thro' obscuring clouds  
 Of objects sensible,—not yet revealed  
 In noontide brightness on the Syrian mount.  
 For thee, the Eternal Majesty of heaven  
 In all things lived and moved,—and to its power  
 And attributes poetic fancy gave  
 The forms of human beauty, strength, and grace.  
 The Naiad murmur'd in the silver stream,  
 The Dryad whisper'd in the nodding wood,  
 (Her voice the music of the Zephyr's breath);

\* Tivoli.

On the blue wave the sportive Nereid moved,  
 Or blew her couch amidst the echoing rocks.  
 I wonder not, that, moved by such a faith,  
 Thou raisedst the Sybil's temple in this vale,  
 For such a scene was suited well to raise  
 The mind to high devotion,—to create  
 Those thoughts indefinite which seem above  
 Our sense and reason, and the hallowed dream  
 Prophetic.—In the sympathy sublime,  
 With natural forms and sounds, the mind forgets  
 Its present being,—images arise  
 Which seem not earthly,—'midst the awful rocks  
 And caverns bursting with the living stream,—  
 In force descending from the precipice,—  
 Sparkling in sunshine, nurturing with dews  
 A thousand odorous plants and fragrant flowers.  
 In the sweet music of the vernal woods,  
 From winged minstrels, and the louder sounds  
 Of mountain storms, and thundering cataracts,  
 The voice of inspiration well might come !”

The following lines on Pæstum, like the preceding, are without date : whether they were written now or afterwards, is of little importance. The reader of the “*Consolations in Travel*” will discover in them that animated description of this celebrated spot with which he opens the third dialogue :—

“ON A DISTANT VIEW OF PÆSTUM.

“The mountains above were clear and bright,  
 Empurpled by the evening light,  
 Not a single cloud was seen in the sky,  
 But the wind was turbulent and high,  
 And full it blew on the Tyrrhene sea,  
 Which rose in billowy majesty :  
 Which rose, but not in its stormy hue,  
 For its colour was brightest, purest blue,  
 Save where it foam'd in crested pride,  
 White as the snow on the glacier's side.  
 Tho' loud the wind, and high the breeze,  
 Murmuring amidst the odorous trees,



Yet Philomel, as if to prove  
 More loud, as well as sweet, the voice of love,  
 Threw from the Caruba her thrilling song,  
 Her minstrel music wild and strong ;  
 And gentle doves in thicket nigh,  
 Heaved, scarcely audible, their sigh.  
 Life seem'd in every thing to be !—  
 The blades of maize—the leafy tree—  
 The cones that shook on the giant pine  
 Seem'd moved by an impulse of power divine.—  
 Joy seem'd to dance in every thing ;  
     The blast was from a zephyr's wing,  
     Moisten'd by that balmy dew  
     Which summer steals from spring,  
     Wafting each instant odours new.  
 Where faintly gleam'd the evening star,  
 Thy temples, Pæstum, from afar,  
 Upraised their marble columns bright  
 In the last gleams of purple light,  
 Above the wild deserted plain,  
 Where death and silence seem'd to reign,—  
 Temples, whose massy form and finish'd grace  
 Speaks of the genius of a Grecian race."

The notes on *Somma* will be given a little further on, with some notices of the scientific researches in which he was engaged during the following winter and spring, on his second visit to the south of Italy.

Of his journey northward into Switzerland I have no particulars to communicate, and nothing of interest to relate, except that at Milan he had the pleasure of seeing Voltá, and the honour of forming the acquaintance of a philosopher to whom modern science lies under so great an obligation. My brother thus speaks of him, and of Piazzzi, and Morichini, in his *Sketches of Distinguished Men*, already alluded to:—

"Voltá I saw at Milan, in 1814, at that time advanced in years,—I think nearly seventy, and in bad health. His conversation was not brilliant; his views

rather limited, but marking great ingenuity. His manners were perfectly simple. He had not the air of a courtier, or even of a man who had seen the world. Indeed, I can say generally of the Italian savants, that, though none of them had much dignity or grace of manner, yet they were all free from affectation.

“In Piazzzi, likewise an old man, there was more of exterior philosophical character than in Voltá; and he discussed subjects with more brilliancy of address, and with a little of the tone of a master.”

“There never was a man of more amiable or benevolent character than Morichini; and his principal discovery shews an acuteness and originality not usual now in his countrymen.”

From Milan he crossed the Alps by the Simplon, and arrived at Geneva in the last week of June. He remained there till the middle of September, residing in a country house, charmingly situated on the banks of the lake. These three months, I have heard him say, were spent very agreeably: the charm of the best society (chiefly English) was added to that of magnificent scenery, and of a delightful summer climate; and he had besides the pleasure of angling. He was able even to enjoy his favourite amusement in the lake from the garden of the villa, which descended to the water's edge.

In returning to winter in Italy he visited some of the most remarkable scenery in the different cantons on the way to the Tyrol, through which he now passed for the first time. I shall extract from a note-book, two little descriptions of scenery, written at the moment, to record some of the peculiarities of a region of which he was ever after extremely fond:—

“October 6, 1814.—Detained at Inspruck two hours.

Came to-day only two posts. The scenery to-day by far the finest I have seen in the Tyrol, and as fine as I have ever seen. Deep glens—in two of them two blue rivers, rolling and foaming over rocks of syenite and micaceous schist. The depth of the glens much greater than in Switzerland; narrow, and pine and birch below; then cultivated patches, and then pine, and birch, and larch again; and, above all, very high mountains, dark and frowning, but having snows on their gullies and bosoms, and on their tops. The sky harmonised with the grandeur and solemnity of the scene; it was clouded, but something like a soft October day in England. The clouds, of the purest white, played amongst the mountains, and gave to their dark firs and nodding rocks a deeper gloom by contrast. Now and then the sun burst forth, and made the yellow birch lighten into tints of gold.”

“October 12, at Vicenza.—Left Trente yesterday morning at half-past five o’clock, and passed through some of the most beautiful scenery I ever saw. At first our road was up a mountain, where six horses were necessary. Features the same as those in the neighbourhood of Trente, and exquisitely beautiful; the valleys clothed with vines sporting round mulberry trees, elms, and fruit trees, and now displaying ripe grapes. The mountains all limestone, at least those so near as to enable me to judge of their nature; and blue, grey, reddish, or white. The town of Trente, in the midst of a highly cultivated valley, watered by the Adige; here a sober, pastoral, clear river, as large or larger than the Tay, containing trout, barbel, and eels, and probably a few grayling. The road from Trente to Bassano is exquisitely beautiful, and the beautiful passing into the sublime. When we came to



the division of the waters (those which feed the Adige, and those that feed the Brenta), a rude sort of porphyry began to appear, and micaceous schist; and the hills crowned with snow, above the Brenta, probably were micaceous schist. On descending, variety of clothed hills, rich in the variegated vegetation of birch, oak, wild grape, thorn, clematis, &c.; a small lake, and then a larger one, beautifully wooded, sending a stream down, very small, to form the Brenta."

In returning to Rome he went by the way of Ferrara and Bologna, and crossed the Appenines to Florence. At Pietra Mala, in the midst of the mountains, and at the height of several thousand feet above the level of the sea, is a remarkable column of flame, of considerable magnitude, which is almost perpetually burning; and in the neighbourhood of it, in more than one place, the springs are agitated by the disengagement of air, which kindles on the approach of a light, and burns with the same kind of flame as the great column. In passing through Pietra Mala, he had some of this air collected; and at Florence, on submitting it to analysis, he found it was carburetted hydrogen, similar to coal gas; and he, of course, inferred that it is of similar origin, probably produced from a bed of coal, acted on by subterraneous heat. These particulars he communicated to me, in a letter which I received from him during his journey, but which, with others written to me during this and his second journey on the Continent, have not, I regret, been preserved.

During the whole of this winter, which he spent at Rome, he was, as usual, variously engaged. The laboratory, the Campagna, and society, with the *et cetæra* of this wonderful city, afforded him ample amusement and occupation.

The society was, of that kind to which he alludes in his "Consolations in Travel,"—"numerous and diversified, containing many intellectual foreigners, and some distinguished Britons, who had a higher object in making this city their residence than mere idleness and vague curiosity."

In the *Campagna* and the adjoining country he took exercise with his gun, and completely recovered his youthful cacciatore taste; and from this time he continued to be almost as keen a fowler as he was before an angler. Nor is it more than might be expected that this taste should have revived here, where there is so much to excite it; the vast quantity of wild fowl, the great variety and succession of birds of passage, the peculiar nature of the ground, and the impressive features of the surrounding scenery.

The results of his chemical researches during this winter he communicated to the Royal Society in three papers, which were published in the "Philosophical Transactions" for 1815, with the following titles and dates:—

"Some Experiments and Observations on the Colours used in Painting by the Ancients."—Jan. 14.

"Some Experiments on a Solid Compound of Iodine and Oxygen, and on its Chemical Agencies."—February 10th.

"On the Action of Acids on the Salts usually called the Hyper-oxymuriates, and on the Gases produced from them."—Feb. 15th.

The first of these papers is very well deserving of being studied by the enlightened painter, who takes an interest in the history and in the preservation of the works of his art: he will find in it an ample account of the colours which have proved permanent in ancient

paintings; with suggestions for the selection of colours, and surfaces capable of resisting the effects of time, founded on chemical principles.

The following letter to his mother written at this time may be worth inserting, as showing the interest he took in the geological society then forming in his native town, and his feeling on the subject of the war then carrying on with America.

“ Rome, Jan. 11, 1815.

“ MY DEAR MOTHER,

“ I am very happy to hear of a disposition to scientific activity in my native town, and shall be happy if I can do anything to be useful to the museum. I will send to it some specimens from the Continent; and if there are subscriptions, pray get my name put down for 20*l*.

“ We have almost as much society here as in London, and a great part of it our old friends.

\*            \*            \*            \*            \*

“ You get all the news much quicker than we do from Vienna. We all hope for a long peace. We all hope that the glory England has gained in a war for the defence of the liberty of Europe will not be thrown away; and that the petty squabble with America, which if successful can do nothing but increase our debt, will be speedily terminated.

“ A happy new year, and many of them, is the sincere wish of your affectionate son,

“ H. DAVY.”

In the beginning of March he went from Rome to Naples, where he remained between a fortnight and three weeks. As in his preceding visit, his attention here was specially directed to the study of the



surrounding volcanic regions, and the investigation of the phenomena of volcanic eruption. The results he communicated to the Royal Society:—in this place, I shall give merely the few rough notes which he wrote down at the time, chiefly respecting Somma, a mountain which excited greatly his curiosity, and which he many times explored, and carefully examined.

“Yesterday, March 16th, ascended Vesuvius, and went round the base of Somma, a most interesting mountain; strata of basaltic, leucitic, and hornblende lava, alternating with ashes, sand, and decomposed stones; some strata of lava vertical and like whin dykes; others more or less inclined; the whole a grand scene of confusion, as if a mountain formed of ashes and small eruptions beneath pressure (probably of the sea) had been split in pieces, and its chasms filled up by very fluid stony matter injected from below.”—He gives a sketch of the vein-like strata which characterise Somma, of which the following is a copy:—



“In Somma,” he continues, “the lava has much the appearance of primitive rock, and one variety is much like the hornblende rock of North Wales.

“I think there can be no doubt that the eruption which raised the cone of Vesuvius split Somma asunder,

and threw a part of it off towards the sea;—thus Vesuvius rises out of Somma.”



He proceeds, — “ *Quære*, Was this at the time of Pliny?

“ Somma itself was evidently a very old mountain. None of the lavas of Vesuvius are to be compared to those of Somma for *crystallization*. As appears from Montecelli’s collection, almost all the known minerals, primary and secondary, are thrown up by Vesuvius; and in the base of the mountain near the hermitage, one finds almost all the primitive rocks. Granite, the same as that of Cornwall, is found amongst the products of Vesuvius, and is probably a formation. Do not all these stones come from the grand deep reservoir where they are formed by slow crystallization? Nothing is more common in Volcanic countries, than for a thin stratum of lava to rise through a mountain of ashes and to overflow them. This is the case at Monte Nuovo.”

Deterred by the plague (which a short time before had broken out at Malta, and in the Levant) from extending his travels further to the eastward, as he had originally designed, he set out on his return to England; he again traversed the Tyrol, and avoided France by a detour through part of Germany and Flanders; embarked at Ostend; landed at Dover; and arrived in London on the 23d of April.

The only notes I have been able to find, kept on this homeward journey, are the few following, relating to his favourite Tyrol, and the north of Italy bordering on it.

“ March 30th, 1815.—I have again passed through the Tyrol as far as Botzin, where we arrived at half-past three this day. We quitted Verona yesterday morning, and came on to Trente, by the Roverido road. The mountains all limestone; and about a mile from Roverido, a scene of savage wildness and desolation, such as I never before saw. The valley of stones in Devonshire is a miniature of it. The Adige does not contain much fish, and rolls through meadows with rows of mulberry-trees. The olive is little seen after Roverido, but the vine is the tree of the country. The limestone mountains here begin to be topped with firs rising amidst the snows; the Mediterranean pine below, the Alpine pine above; Switzerland as it were mingling with Italy. The spring just beginning, but the weather very hot in the valley of Botzin; as hot as our July. The rocks just below Botzin very picturesque porphyry. The river very low and clear, but I think much larger than the Spey. Around Botzin very grand scenery; peaks of granite rising in the east and north from snowy mountains, pines below, and fresh wood in the valley, displaying the delicate green of early spring.”



“ April 2.—In going up the Bremen, observed two interesting phenomena. The rivers formed by the melting of the snow coming in contact with the warm air, blowing up from Italy, threw down steam from the air, so as to seem as if boiling. Saw a number of small glaciers, formed by the snow-water, trickling down amidst snow in the day, and frozen in the night. Pines and larches the abundant trees, after passing the Bremen. A number of fine castles on the mountains in the Tyrol.”

It was either this spring, or the preceding autumn, when amongst the mountains of the Tyrol, that he received a present of a Tyrolese rifle from the hands of a patriotic native, who had used it in the war of defence, so long and so heroically, maintained against the invaders of his country. The manner of receiving this present was the following, as related in conversation by the distinguished and kind-hearted individual to whom it was transferred.\* I shall give the narration, as I had it, from Mrs. Davy, who wrote it down an hour or two after hearing it, knowing how much it would interest me.

After mentioning how he had formed my brother's acquaintance, when young in the voyage of life, and happy in the enjoyment of simple pleasures, Sir Walter Scott continued in his kind way: “ There was one very good thing about him, he never forgot a friend; and I'll tell you a thing he did to me that makes me particularly say so. When he was travelling in the Tyrol, the old patriot leader, Speckbacher, was very ill, suffering from rheumatism, or something of that sort; and when he heard there was a great philosopher in the

\* This was written in the winter of 1831-2, just after Sir Walter Scott's visit to Malta.

neighbourhood, he thought of course he must be a doctor, and sent to beg some advice about his complaint. Sir Humphry did not profess to know much of medicine, but he gave him something, which luckily relieved his pain; and then the gratitude of the old chief made him feel quite unhappy because he refused to take any fee. So Sir Humphry said, ‘Well, that you may not feel unhappy about not making me any return for my advice, I’ll ask if you have any old pistol, or rusty bit of a sword, that was used in your Tyrolese war of defence, for I have a friend that would be delighted to have any such article; and you may depend on its being hung up in his hall, and the story of it told for many a year to come.’ Speckbacker struck his hands together, much pleased with the request, and said, ‘Oh, I have the very thing! you shall have the gun that I used myself when I shot thirty Bavarians in one day.’ The illustrious gun was given accordingly to Sir Humphry, who brought it with him on his next visit to Scotland, and deposited it with me, at Abbotsford, himself.”

The following letter to his mother was written soon after his return :—

“ May 5, Nerot’s Hotel, Clifford-street, London.

“ MY DEAR MOTHER,

“ You will have heard from John of our safe return. I wrote to you from Naples, and from Brussels. I hope you received my letters.

“ We have had a very agreeable and instructive journey, but Lady Davy agrees with me in thinking that England is the only country to *live* in, however interesting it may be to *see* other countries.

"I yesterday bought a good house in Grosvenor-street, and we shall sit down in this happy land.

\* \* \* \* \*

"I am, my dear Mother,

"Your very affectionate Son,

"H. DAVY."

The following lines, on London, have the date of 1814. They were probably written immediately on his return from the Continent,—at a moment when strongly impressed by the peculiarities of this wonderful city.

London, 1814.

"Such art thou ! mighty in thy power and pride ;  
 No city of the earth with thee can vie ;  
 Along thy streets still flows the unceasing tide  
 Of busy thousands. E'en thy misty sky  
 Breathes life and motion, and the subject waves,  
 That wash thy lofty arches, bear the wings  
 Of earthly commerce, where the winds, thy slaves,  
 Speed the rich tribute to the ocean kings.—  
 Thy graves and temples filled with mighty dead  
 Are awful things.  
 Here in the dust the noble and the proud,  
 The conquerors of nature and of man,—  
 Those for whom Fame her clarion sounded loud,  
 Who triumphed o'er the ocean, earth, and air,  
 All now are found beneath a few carved stones,—  
 Conquerors and sages, deep beneath the sod.—  
 Shall future mightier piles e'er hide such bones  
 As these high worthies were ?—Allied to God,  
 Gifted with noble hopes and aspirations,—  
 And perfecting their will,—and rising high,  
 (The wonder and the blessing of the nations,)  
 To the true source of immortality,  
 Showing a virtue which can never die !"

Soon after his return from the Continent he entered upon a new train of inquiry,—the investigation of fire-damp, with a view to the protection of the mines in which it occurs, and the workmen who are exposed to its destructive agency ;—objects of the first impor-



tance in relation to the interests of humanity, and hardly less so as regards national wealth; and which were completely accomplished by his well-known discovery of the safety lamp.

He first published the results of the investigation in the "Philosophical Transactions," in a series of papers, which rapidly succeeded each other, and which were communicated to the Royal Society without hesitation or delay, without any mystery or concealment, and in the simplest and least ostentatious manner possible. When he had brought the inquiry to a certain close, he wrote a connected account of all his labours on fire-damp and flame. The work was entitled, "On the Safety Lamp, for preventing Explosions in Mines, Houses lighted by Gas, Spirit Warehouses, and Magazines in Ships, &c.; with some remarks on Flame,"—"with the hope (as he states in the preface) of presenting a permanent record on this important subject to the practical miner, and of enabling the friends of humanity to estimate and apply those resources of science, by which a great and permanently existing evil may be subdued." He adds, "I have given the extracts from my papers nearly in the order in which they were published, which will, I hope, both render the facts more intelligible, and show the gradual progress of the inquiry, in which every step was furnished by experiment and induction, in which nothing can be said to be owing to accident, and in which the most simple and useful combination arose out of the most complicated circumstances."

"The results of these labours," he continues, "will, I trust, be useful to the cause of science, by proving, that even the most apparently abstract truths may be connected with applications to the common wants and purposes of life."

He concludes his preface by remarking, that “the gratification of the love of knowledge is delightful to every refined mind; but a much higher motive is offered for indulging in it, when that knowledge is felt to be practical power, and when that power may be applied to lessen the miseries, or increase the comforts, of our fellow-creatures.”

The ardour with which he pursued science was strongly shown in the rapidity of his labours relating to this great discovery. In August 1815, his attention was first particularly directed to the subject of fire-damp. He was then in the Highlands of Scotland on a shooting excursion. On his way back he stopped at Newcastle, and made minute inquiries into the circumstances of the mines in connection with the destructive agent. At his request, specimens of fire-damp were forwarded to him in London. He then entered, in his laboratory, on the experimental investigation. On the 9th of November, the results of his inquiry were read to the Royal Society, and the principle of the safety lamp was announced; and the lamp itself was perfected in December.

He began his successful search after a remedy by instituting a minute investigation of the composition of fire-damp, and of its chemical qualities.

He found, as had been before stated by Dr. Henry, that it was hydrogen or pure inflammable air combined with charcoal or carbon,—that compound known to chemists by the name of light carburetted hydrogen.

He found that it required to be mixed with a very large quantity of atmospheric air, to produce an explosion; that it was the least readily combustible of all the inflammable gases, or required the highest temperature, being neither exploded nor fired by red-hot charcoal, or

red-hot iron; and further, that the heat it produced when inflamed was less than from any other inflammable gas, and consequently that the expansive effect from heat attending its explosion was also less.

He found, that on mixing one part of carbonic acid, or fixed air, with seven parts of an explosive mixture of fire-damp, or one part of azote with six parts, their power of exploding was destroyed.

He found that in exploding a mixture in a glass tube, of one-fourth of an inch in diameter, and a foot long, more than a second was required before the flame reached from one end to the other; and that in tubes of one-seventh of an inch in diameter, explosive mixtures could not be fired, when they opened into the atmosphere; and that metallic tubes prevented explosion better than glass tubes.

These were the facts from which the discovery of the safety lamp was made; and the following was the process of reasoning which led to the discovery.

He remarks,—“In reasoning upon these various phenomena, it occurred to me, as a *considerable* heat was required for the inflammation of the fire-damp, and as it produced in burning a comparatively *small degree* of heat, that the effect of carbonic acid and azote, and of the surfaces of small tubes in preventing its explosion, depended upon their cooling powers, upon their lowering the temperature of the exploding mixture so much that it was no longer sufficient for its continuous inflammation.”

He proceeds,—“This idea, which was confirmed by various obvious considerations, led to an immediate result,—the possibility of constructing a lamp in which the cooling powers of the azote or carbonic acid formed by the combustion, or the cooling power of the aper-



tures through which the air entered and made its exit, should prevent the communication of explosion."

Prosecuting this idea, after various trials, he very soon attained the object of his wishes, and effected more than the most sanguine imagination could have anticipated; more, indeed, than could reasonably have been supposed possible *à priori*. And this was the invention of the safety lamp,—a cage of wire-gauze, which actually made prisoner the flame of the fire-damp, and in its prison consumed it; and whilst it confined the dangerous explosive flame, it permitted air to pass and light to escape; and though, from the combustion of the fire-damp, the cage might become red-hot, yet still it acted the part of a safety lamp, and restrained the flaming element within its narrow bounds, simply by presenting a surface of net-work, the temperature of which, under ordinary circumstances,\* the imprisoned flame was not capable of raising to a height required to explode either the fire-damp without, or to allow the flame kindled within to pass unextinguished.

"This is exactly such a case as we should choose to place before Bacon, were he to revisit the earth, in order to give him, in a small compass, an idea of the advancement which philosophy has made, since the time when he had pointed out to her the route which she ought to pursue." Thus writes Mr. Playfair, in his admirable remarks on the safety lamp in the *Edinburgh Review* for Feb. 1816, having previously remarked that 'Bacon

\* When the unusual circumstance of an eruption of gas in a strong current occurs in a mine, or when the explosive atmosphere of a mine is unusually agitated, then for security, the lamp requires to be used with certain precautions, as pointed out and strongly insisted on by my brother, in the work just referred to—(Vide *Op. cit.* pp. 136, and seq., and 152)—precautions, most easily taken, without the aid of any additional apparatus.

could say with truth, at the time when he wrote, that science could hardly boast of a single experiment which had served to increase the power, to diminish the suffering, or to augment the happiness of mankind. ‘*Jam per tot annorum spatia, vix unum experimentum adduci potest quod ad hominum statum levandum et juvandum spectat, et philosophiæ speculationibus ac dogmatibus, neve acceptum referri possit.*’ The great use of an immediate and constant appeal to experiment,” he proceeds, “cannot be better evinced than in this example. The result is as wonderful as it is important. An invisible and impalpable barrier made effectual against a force the most violent and irresistible in its operations; and a power, that in its tremendous effects seemed to emulate the lightning and the earthquake, confined within a narrow space, and shut up in a net of the most slender texture,—are facts which must excite a degree of wonder and astonishment, from which neither ignorance nor wisdom can defend the beholder. When to this we add the beneficial consequences and the saving of the lives of men, and consider that the effects are to remain as long as coal continues to be dug from the bowels of the earth, it may fairly be said that there is hardly in the whole compass of art or science a single invention of which one would rather wish to be the author. It is little that the highest praise, and that even the voice of national gratitude, when most strongly expressed, can add to the happiness of one who is conscious of having done such a service to his fellow men. We hope, however, that some distinguished mark of such gratitude will not be wanting to a person who, by disarming one of the most powerful agents of destruction, has so well merited a civic crown. In this, indeed, the honour of the giver is more interested than the

receiver. The latter may not admit of much increase ; but it nevertheless becomes those who administer the affairs of a free people, to show themselves grateful for benefits conferred, even on the humblest and most obscure of their fellow citizens."

The acknowledgments which were made to him on this occasion, and the grateful feeling expressed,—though not in the national manner, Mr. Playfair had hoped, were as highly complimentary as possible, being chiefly from the parties themselves concerned—the coal-owners. He received letters of thanks from various individuals, and from the united colliers of Whitehaven ; a vote of thanks from the coal trade of the north of England,—of the grand jury of Durham,—and of the chamber of commerce at Mons. And besides thanks, as a permanent mark of their obligations, he was presented with a service of plate of the value of £2,500,\* at a public dinner given to him at Newcastle on the 11th October, 1817, at which Mr. Lambton, now Earl of Durham, presided. His address on presenting the plate, and the answer returned, will always, I apprehend, be read with interest, both on account of the individuals concerned, and the time, and the occasion,—keeping in mind Mr. Playfair's remarks,—and the freshness and truth of feeling which must then have prevailed.

\* The following inscription was inscribed on the centre piece :—

“ NEWCASTLE-UPON-TYNE, 1817.

“ THIS SERVICE OF PLATE WAS PRESENTED  
TO SIR HUMPHRY DAVY BY THE SUBSCRIBERS,  
AS A TOKEN OF GRATITUDE FOR HIS INVALUABLE INVENTION  
OF THE SAFETY LAMP.”

Underneath were the subscribers' names :—

“The Duke of Northumberland.

The Lord Bishop of Durham.



“ Sir Humphry, — It now becomes my duty to fulfil the object of the meeting, in presenting to you this service of plate, from the coal owners of the Tyne and Wear, as a testimony of their gratitude for the services you have rendered to them and to humanity.

“ Your brilliant genius, which has been so long employed in an unparalleled manner, in extending the

The Dean and Chapter of Durham.

Sir Ralph Noel, Bart.

John Geo. Lambton, Esq. M.P.

Thomas H. Graham, Esq.

George Silvertop, Esq.

Dixon Brown, Esq.

Matthew Russell, Esq. Walls End Colliery.

Owners of Hebburn Colliery.

Owners of Percy Main Colliery.

Owners of Heaton Colliery.

Owners of Jarrow Colliery.

Samuel Williams, Esq. & Co. Cox Lodge Colliery.

Owners of Fewden Colliery.

Owners of Manor Walls End Colliery.

Owners of Townley Main Colliery.

Owners of Sheriff Hill Colliery.

Owners of Boswich Main Colliery.

Owners of Benwell Colliery.

Owners of Pontop Colliery.

Wm. M. Pitt, Esq. Tanfield Moor Colliery.

Christopher Blackett, Esq. Wylom Colliery.

Owners of Welbottle Colliery.

Owners of Hartley Colliery.

Owners of Glowick Colliery.

Morton J. Davidson, Esq. Beamish Colliery.

John George Lambton, Esq. M.P. Lambton Colliery.

Lady Frances Anne Vane Tempest, Eden Main Colliery.

Warren Maude Lamb, Esq.

Mr. William Stabant, jun. Talfield Colliery.

J. D. Nesham, Esq. & Co. Nesham Main Colliery.

Matthew Russell & Co. Waslington New Colliery.

John Carr, Esq. Oxetone Colliery.

Mr. John Humble, Leefield Colliery.”

boundaries of chemical knowledge, never accomplished a higher object, nor obtained a nobler triumph.

“ You had to contend with an element of destruction which seemed uncontrollable by human power; which not only rendered the property of the coal owner insecure, but kept him in perpetual alarm for the safety of the intrepid miner in his service, and often exhibited to him the most appalling scenes of death and heart-sickening misery.

“ You have increased the value of an important branch of productive industry; and, what is of infinitely more importance, you have contributed to preserve the lives and persons of multitudes of your fellow-creatures.

“ It is now nearly two years that your safety-lamp has been used by hundreds of miners, in the most dangerous recesses of the earth, and under the most trying circumstances. Not a single failure has occurred; its absolute security is demonstrated. I have, indeed, deeply to lament more than one catastrophe, produced by fool-hardiness and ignorance, in neglecting to use the safe-guard you have supplied; but these dreadful accidents, even, if possible, exalt its importance.

“ If your fame had needed any thing to make it immortal, this discovery alone would have carried it down to future ages, and connected it with benefits and blessings.

“ Receive, Sir Humphry, this permanent memorial of our profound respect and high admiration; a testimony, we trust, equally honourable to you and to us. We hope you will have as much pleasure in receiving as we feel in offering it. Long may you live to use it; long may you live to pursue your splendid career of

scientific discovery, and to give new claims to the gratitude and praise of the world !”

He replied :—

“Gentlemen, I feel it impossible to reply, in an appropriate manner, to the very eloquent and flattering address of your distinguished chairman. Eloquence, or even accuracy of language, is incompatible with strong feeling; and on an occasion like the present, you will give me credit for no small degree of emotion.

“I have been informed that my labours have been useful to an important branch of human industry connected with our arts, our manufactures, commerce, and national wealth. To learn this from such practical authority, is the highest gratification to a person whose ardent desire has always been to apply science to purposes of utility.

“It has been also stated, that the invention which you are this day so highly honouring has been subservient to the preservation of the lives and persons of a most useful and laborious class of men: this, coming from your own knowledge, founded upon such ample experience, affords me a pleasure still more exalted; for the highest ambition of my life has been to deserve the name of a friend to humanity.

“To crown all, you have, as it were, embodied these sentiments in a permanent and magnificent memorial of your good opinion. I can make only imperfect and inadequate efforts to thank you.

“Under all circumstances of my future life, the recollection of this day will warm my heart; and this noble expression of your kindness will awaken my gratitude to the latest moment of my existence.”

And on sitting down his health having been drunk with “three times three,” he spoke as follows :—



“Gentlemen, I am overpowered by these reiterated proofs of your approbation. You have overrated my merits. My success in your cause must be attributed to my having followed the path of experiment and induction discovered by philosophers who have preceded me : willingly would I divide your plaudits with other men of science, and claim much for the general glory of scientific discovery in a long course of ages.

“Gentlemen, I might dwell at some length upon the great increase of wealth and power to the country within the last half century, by scientific invention, which never could have existed without coal mines : I shall refer only to the improvement in the potteries, to the steam-engine, and to the discovery of the gas-lights.

“What an immense impulse has the steam-engine given to the arts and manufactures ! How much has it diminished labour, and increased the real strength of the country, far beyond a mere increase of population ! By giving facilities to a number of other inventions, it has produced even a moral effect, in rendering capital necessary for the perfection of labour, credit essential to capital, and ingenuity and mental energy a secure and dignified species of property.

“Science, gentlemen, is of infinitely more importance to a state than may at first sight appear possible ; for no source of wealth and power can be entirely independent of it ; and no class of men are so well able to appreciate its advantages as that to which I am now addressing myself. You have not only derived from it the means of raising your subterraneous wealth, but those also of rendering it available to the public.

“Science alone has made pit-coal such an instrument in the hands of the chemist and mechanic ; it has made the elements of fire and water perform operations,

which formerly demanded human labour ; and it has converted the productions of the earth into a thousand new forms of use and beauty.

“ Gentlemen, allow me to observe in conclusion, that it was in pursuing those methods of analogy and experiment, by which mystery had become science, that I was, fortunately, led to the invention of the safety lamp. The whole progress of my researches has been registered in the ‘Transactions of the Royal Society,’ in papers which that illustrious body has honoured by their biennial medal, in which I can conscientiously assert, that I have gratefully acknowledged even the slightest hints or offers of assistance which I have received during their composition.

“ I state this, gentlemen, not from vain-glory, but on account of certain calumnious insinuations which have arisen, not in the scientific world—for to that the whole progress of my researches is well known—but in a colliery. I must ever treat these insinuations with contempt ; and after the honest indignation which has been expressed against them by the coal owners in general, I cannot feel any anxiety on the subject ; nor should I have referred to it at all, did I not believe that the very persons amongst whom these insinuations originated were extensively benefited by, and were constantly using, the invention they would seek to disparage. I could never have expected that such persons would have engaged their respectable connections in mean attempts to impeach the originality of a discovery given to them in the most disinterested manner, and for which no return was required but an honest acknowledgment of the benefit, founded upon truth and justice.

“ I do not envy them their feelings, particularly at

the present moment. I do not wish to inquire into their motives. I do hope, however, that their conduct has been prompted by ignorance rather than by malevolence, by misapprehension rather than by ingratitude.

“It was a new circumstance to me that attempts to preserve human life, and to prevent human misery, should create hostile feelings in persons who professed to have similar objects in view.

“Gentlemen, I have had some opposition, much labour, and more anxiety during the course of these researches; but had the opposition, the labour, and the anxiety been a thousand times as great, the events of this day would have been more than a compensation.”

Besides this present from the coal owners, he received also a splendid silver-gilt vase from the late Emperor Alexander of Russia, accompanied by a letter from the Emperor himself, expressive of his sentiments in relation to his important discovery; and further, by his own sovereign, a baronetcy was conferred on him in 1818.

He was urged by many of his friends to take out a patent for the safety lamp; but such a measure did not accord with his feeling of propriety,—was not suitable to his views of the dignity of science: he preferred making it a gift to his country. Mr. Buddle, than whom no one could more justly appreciate the value of his invention, was, as he himself states, one of these friends.\*

\* If a patent could have secured a uniform and correct construction of the safety lamp, it is to be regretted that he did not give his invention the advantage of such a protection against counterfeits, merely with a view to the public good, and for the sake of humanity; for I have been well informed that in too many instances the proprietors of collieries, intent on a miserable economy, have procured and employed cheap lamps, of doubtful safety, made by uninformed artists, ignorant of the true principle on which the safety of the invention depends.



“I felt,” he says, “that he did not contemplate any pecuniary reward; and in a private conversation, I remonstrated with him on the subject. I said, ‘You might as well have secured this invention by a patent, and received your five or ten thousand a-year from it.’ The reply of this great and noble-minded man was — ‘No! my good friend, I never thought of such a thing: my sole object was to serve the cause of humanity; and if I have succeeded, I am amply rewarded in the gratifying reflection of having done so.’ I expostulated (Mr. Buddle continues), saying his idea was much too philosophic and refined for the occasion. He replied, ‘I have enough for all my views and purposes: more wealth might be troublesome, and distract my attention from those pursuits in which I delight. More wealth,’ he added, ‘could not increase either my fame or my happiness. It might undoubtedly enable me to put four horses to my carriage; but what would it avail me to have it said that Sir Humphry drives his carriage and four?’”

Such a successful result as the safety lamp and triumph of experimental science over difficulties so formidable, and at first view, and to common observation, apparently unconquerable, would have more than satisfied ordinary minds; his mind was rather stimulated by it to fresh exertion; and, without stop, he engaged in a new series of labours relating to the nature of flame, — which he

Instances of this kind are related by some of the witnesses, who gave evidence before the Select Committee of the House of Commons appointed to inquire into accidents in mines in 1835. Thus, at page 32, Dr. Clanny says, “In some of the more extensive mines, there are some men employed in making these lamps, and very inferior ones they are, in many instances;” and, to which he attributes “accidents otherwise unaccounted for.” Mr. N. Wood and Mr. G. Johnson bear testimony to the same effect.

prosecuted with the same zeal, and made discoveries, not indeed so important to society as the former, but almost as curious, unexpected, and extraordinary, and hardly less important in relation to science, —and which led to the last improvement which he made in the safety lamp. This improvement was the addition of a means of giving light in an atmosphere too foul for vivid combustion and the production of flame, by introducing a small cage or spiral of platinum wire just above the wick of the lamp. This had the marvellous effect of occasioning the combination of the inflammable air with oxygen, or its combustion at a temperature only sufficiently high to make the platinum luminous,—not sufficiently high to have this effect on the volatile products of the combustion; or, in other words, produce flame. Thus improved, the miner with the safety lamp might work in any part of the mine where life could be supported, and have the advantage of a steady though feeble light.

I shall here pause and give a selection of his thoughts and views on various matters, which are scattered through his note-books kept during this period of his life.

“Persons of very exalted talents and virtues may be said to derive their patent of nobility directly from God; and their titles are not registered in perishable court calendars, but written in the great histories of Nature or of Man.”

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“Those brilliant and poetical works in which enthusiasm takes place of reason, and in which the human intellect exhausts itself, as it were, in imagination and feeling, resemble monstrous flowers, brilliant and odorous, but affording no materials of re-production.”

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“Men value most what is obtained with most difficulty and what is most uncommon; and certain ancient superstitions have given an air of sanctity and veneration to trifles, so that in the world things are hardly ever valued according to their real worth. A moss-grown stone hallowed by some monkish legend is often adored, whilst a god produced by the genius of Phidias is neglected.”

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“To look for moral codes and political axioms in works of a certain description, would be to look for the ancient history of nations in their mythology; and to endeavour to trace the form and the laws of the motions of the sun in the clouds surrounding him at sunset.”

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“We see the healthy activity and the happiness of social life with little or no interest; but we are awakened by discordant states of it, and by all the forms of misery. Those who confer benefits of the highest kind are neglected, whilst the persons who have most contributed to the misery of individuals are often exalted to the highest rank. An Attila, or a Genghiz Khan in miniature, are not uncommon. The dew descends from heaven, the sunbeam kindles life where it falls; but they are neglected; the earthquake, the volcano, and the tempest are registered: yet in our annals the quiet permanency of benefactions is well contrasted with the feverish transiency of the great and the terrible.”

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Of the French at their revolution he writes,—“They did not, like the English patriots, kindle a sacred flame of liberty by the light of which they read their ancient



law ; but they kindled a devouring flame of anarchy, calling it a fire of liberty, and fed it with all that was sacred in their religion and their law ; and after having burnt the records of their faith, they frantically danced round it, like a nation of savages, whilst the bleached and parched bones of victims seemed to show that a nation of cannibals had been celebrating a feast to Moloch."

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"In minds of great power, there is usually a disposition to variety of pursuits, and they often attempt all branches of letters and science, and even the imitative arts ; but if they become truly eminent, it is by devotion to one object at a time, or at most two objects. This sort of general power is, like a profusion of blossoms on a fruit tree, a symptom of health and strength ; but if all are suffered to become fruit, all are feeble and bad ; if the greater portion is destroyed by accident or art, the remainder being properly nourished become healthy, large, and good."

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"The advance of years brings indifference, and at the same time strength and steadiness. The young sapling is moved by every breeze ; shoots forth its leaves vigorously when favoured by dew and sunshine ; but is often severely injured, if not destroyed, by frosts. In the mature tree, as the heartwood is covered by many coatings of sapwood, it becomes compressed and harder ; but though it loses its vitality, it contributes to the strength of the vegetable."

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"It is not that honours are worth having, but it is painful not to have them. A star gives consequence in the eye of the common world, and even those people

who most affect to despise such external signs of court favour are often influenced by them. Honours are to true glory what artificial lights are to sunshine: they attract those eyes that are not fitted for sunshine. The bat and the moth fly towards the torch, and the eagle soars towards the heavens. But it may be said of artificial lights that they are useful to all eyes; and when they are intended to illumine, and not to dazzle, their effect is excellent. Elizabeth was very chary in distributing her honours, and hence they were valued."

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"In general the stream of court favour is like a stream in an alluvial country: the banks by which it is to be reached are muddy; and whoever would drink of the waters must wade through dirt to reach them, and *stoop* for his draught."

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"Our ministers attribute to themselves, to their councils and plans, the downfall of Bonaparte; the Romish priests consider it as owing to their prayers and anathemas. Certainly a pious man, who regards Heaven as influenced by prayer, may find more reason in the last than in the first; for our ministers could have nothing to do with the frost of Smolensko, or with Bonaparte's obstinacy after he had driven the allies from Troyes; and before *that* Lord Castlereagh would have signed a peace, which would have offered breathing time to a man whose life was pledged for empire, and whose path to empire was the destruction of Britain."

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"It is better to deserve honours and not to have them, than to have them and not deserve them."

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"Pride makes men entertaining only to themselves; vanity makes them entertaining to others."

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“It is in society as in nature—not the useful, but the ornamental, that strikes the imagination. The monstrous flower, which produces nothing, arrests the eye; the modest and humble germ of the grain, the staff of human life, is passed by with neglect: but the one is the fancy of the florist, and fades, and dies, and disappears for ever; the other is propagated from generation to generation, eternal in its use.”

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“The brilliant decorations which ornament the courts of Europe, those lights from mock suns and stars, are the creations of a moment; but they cause more wonder than the rays from the real sun and stars. Men of the world look on the ground for reflected lights, and scarcely ever raise their eyes above to the lights in the heavens, and to the names that are written there, which are almost invisible, and have no greatness, save when they are seen through the telescope of time; yet they are everlasting, and are viewed from all parts of the earth, and by all people.”

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“Science, unlike literature, is independent of taste or caprice.”

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“Whoever wishes to enjoy *peace*, and is gifted with great talents, must labour for posterity. In doing this, he enjoys all the pleasures of intellectual labour, and all the desire arising from protracted hope. He feels no envy nor jealousy; his mark is too far distant to be seen by short-sighted malevolence, and therefore it is never aimed at.”

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“To raise a chesnut on the mountain, or a palm in the plain, which may afford shade, shelter, and fruit for



generations yet unborn, and which, if they have once fixed their roots, require no culture, is better than to raise annual flowers in a garden, which must be watered daily, and in which a cold wind may chill or too ardent a sunshine may dry."

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"The best faculties of man are employed for futurity: speaking is better than acting,\* writing is better than speaking. The politician is a creature of to-day; the philosopher a child of to-morrow: the one is like the upper surface of the water, changed by the wind, the cloud, and the sunshine; the other is like its depths, always tranquil and unchanged."

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"Probably there is an analogy in all *existence*: the divided tail of the fish is linked in a long succession of like objects with the biped man. In the *planetary system* it is probable man will be found connected with a higher intellectual nature; and it is possible that the *monad*, or soul, is constantly undergoing a series of progressions."

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"Our institutions may be regarded as the frames in which the web of social life is woven, where the warp of self-interest is crossed by the woof of feeling and reason, and in which the coloured or figured threads may be regarded as those of sentiment; and so a stuff is framed, not only strong but likewise brilliant."

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"When young shoots grow on a rotten trunk, the only way to save them is to detach them. Analogy—rotten aristocracies and governments, and young and vigorous life amongst the people."

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\* That is, theatrical acting.

“The works of scientific men are like the atoms of gold, of sapphire and diamonds, that exist in a mountain; they form no perceptible part of the mass of the mountain; they are neglected and unknown when it is entire; they are covered with vegetable mould, and by forests. But when time has sapped its foundation—when its fragments are scattered abroad by the elements, and its decayed materials carried down by rivers, then they glitter, and are found; then their immortality is known, and they are employed to ornament the diadems of emperors and the sceptres of kings. They press under them the brows of majesty. They lie too deep to be readily found. When sovereigns are at the expense of digging out these riches, they are repaid by seeing them gems in their crowns; and *they* shine imperishable, independent of their greatness and glory.”

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“The aspirations for immortality are movements of the mind similar to those which the bird makes with its wings before they are furnished with feathers.”

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“How much increase of riches,—coal mines, mineral treasures, increase of health by ventilation, draining, &c.—increase of strength by gunpowder, steam-engine, &c., characterise modern times! These are imperishable. The strength of armies will pass away. It is not the thunder-storm and the whirlwind, but the dews, the rain, and the sunshine, that fertilize the earth.”

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“God governs man by the simplest and most benevolent means,—hope and fear. The powers and affections of life cling even to the rudest and most turbulent characters, and the deeper we examine the more they are found. Thus, though the surface of the rock in the

stormy sea and most rapid torrent is bare; yet below the surface it is covered with vegetation, fed by the raging and foaming waters."

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"Beware of too much prosperity and popularity. Life is made up of mixed passages—dark and bright, sunshine and gloom. The unnatural and excessive greatness of fortune of Alexander, Cæsar, and Napoleon;—the first died after divine honours were paid him; the second gained empire, the consummation of his ambition, and lost his life immediately; the third, from a private individual, became master of continental Europe, and allied to the oldest dynasty, and after his elevation his fortune immediately began to fall. Even in private life, too much prosperity either injures the moral man and occasions conduct which ends in suffering, or is accompanied by the workings of the envy, calumny, and malevolence of others. These circumstances ought to reconcile us to calumny, envy, and misrepresentation. The universal voice of fame, popularity, honour, &c., belong only to the dead or the dying. See the beautiful lines on Pope,—

‘That day, for come it must,—  
That day shall we lament to see, &c.’”

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"In the exercise of intellectual power there is a high degree of enjoyment, which has compensated for the neglect, persecution, and imprisonment of the greatest men—Galileo, Roger Bacon," &c.

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"We know nothing at all of the plan or scheme of the universe, but we believe there is a plan. Consequently, events may in fact have a connection which appear to *us* the most unconnected and remote. If the



popular and anti-philosophical view of omens, prophecies, and prodigies be correct, this is the only philosophical solution that can be given. The apparent ravings of Thomas the Rhymer, respecting the Mackenzie family, have no natural connection with the remarkable event of which I am an historical witness; no more than the rattling of the wheels of a carriage at an inn door with the death of poultry, which, however, we know is the remote cause. The chickens can as much fathom this, as we can the mysteries of our being and nature."

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"Human life may be compared to mountain scenery in a cloudy and windy day, when the clouds cover more sky than is open. We wonder at the bright light, travelling rapidly along the surface of the mountain, and while we wonder it is gone. Now the distances appear in light, and now in shade; and parts of the horizon of futurity are bright in sunshine, and others dark in gloom. The hopes that we have with respect to another state of existence may be compared to the reflections that we see in the sky, when we ourselves are in gloom, from a distant sunny country. We are conscious that there is a lighted surface in sunshine, though we are totally ignorant of the source of it."

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"Our histories of past events are somewhat like the wrecks upon the sea-beach: things are often thrown up because they happen to be light, or because they have been entangled in sea-weed; *i. e.* facts are preserved which suit the temper or party of a particular historian."

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"The coming of the blast is shown by the noise of the distant wood. The philosopher knows that vibra-

tions in the air travel infinitely quicker than its currents; and to him the circumstance is a scientific principle, whilst to the savage it is only a vague omen. So omens of every kind, if we could trace the long chain of causes and effects, would be either naturally associated symptoms or causes."

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"To infinite wisdom the past, present, and the future are alike; and gleams of that wisdom are sometimes bestowed upon the meanest and most insignificant beings. Vultures assemble where battles are to be fought, and the carrion fly buzzed round Buckingham before he received the blow of the assassin."

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"Believing in a *present* Deity.—I think we can hardly avoid referring instinct to his immediate influence, and, of course, the particular case is involved."

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"In the beginning of all pursuits, sympathy, or a desire of obtaining the approbation, or respect, or admiration of our fellow-men, has the greatest influence over the mind; thus we hunt, and fish, and shoot in society, and glory in success: at last, however, the pursuit itself becomes abstracted; and this is fortunate, for we learn how selfish human nature is as we grow older."

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"The miser knows that money is power, and that it represents almost all that is sought for, desired, and envied by mankind, and he is perfectly happy in increasing his latent power; yet in reality he is as absurd as the man who should pass his life in accumulating gunpowder, because it is the instrument by which battles are won."

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“May it not be imagined that the monads or spiritual germs which animate or create organic forms have no relation to space, and pass from systems to systems, wholly unlike matter, which is limited to its own gravitating sphere? Is not light the first envelope of the monads, and may not my earliest hypothesis be true?”

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“What is true with respect to matter will probably with respect to spirit be absolutely false, as supposing organization only the link or substratum of thought: all analogies will fail us from gross matter applied to light.”

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“Is there not a monad, or one perceptive atom or principle, which plays, as it were, round different arrangements in the brain, and which acts in its own little world, as the great diffusive monad does in the universe? But how far beyond our power of conception! how we are lost! and how infinitely little of man and his thoughts becomes most evident!”

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“Men who have considered nature only by what is visible, and who find in the forms and energies of matter the generation of thought, are like children, who may consider the motion and action of a steam engine as produced by solid matter; ignorant of the elements of fire and water, which are the immediate cause of its activity, or of the physical discoveries of human intelligence by which the combinations producing it were made.”

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“What is the instinct of animals but an immediate revelation? and they have more instinct in proportion



as they have less reason. In the infancy of human society, man being a more perfect animal required more *moral instincts* or revelations to preserve his social existence. Now, even the rudest people are accessible to the more civilized, and special revelations are no longer necessary.

“It is quite certain that in these revelations no new ideas were given, and no new impressions received; even the supposed presence of Deity may have been an imagination of a human form, and the miracles delusions of the human mind, though clearly disposed to these delusions by the existence of the instinct; and this, indeed, is in accordance with the divine wisdom and power, as it is much more easy for mind to produce an ideal conviction of satisfied appetite, than to create a new quantity of matter, which must have been the case, if the few small loaves and fishes had been sufficient to satisfy the multitude in the wilderness.”

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“If we suppose very high pressure, even organic compounds may exist under circumstances which would appear incompatible with them. If we suppose an aqueous vapour atmosphere swimming above our common atmosphere, and weighing a hundred times as much, and our atmosphere heated so highly that the pressure made it exactly of the same specific gravity as it now is, limestone might be fluid, and yet animals live in water; because their decomposition would not be more certain than it now is, and there would be very little difference in the surface, except in the fluidity of certain forms of matter, the extensive atmosphere, and the self-shining character of the globe.

“The force of attraction being so great in the sun, no decomposition or changes could take place, if there was

not some compensating relative energy ; so that if it be composed of matter like our earth, *life* could not exist upon it, unless its temperature were very elevated. 'The planets most distant from the sun are larger, but composed of lighter matter probably ; for the same reason, it may be a matter more susceptible of expansion from heat.'

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“RELIGION.—INSTINCT.

“With respect to my ideas of revelation or instinct, it is easy for the Supreme Intelligence to form a thinking being such as Newton, as a crystal, without the slow process of generation of body or mind.”

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“Adam's first inspiration transmitted to his offspring.—Religious instincts may be hereditary,—moral excellencies and physical, as well as defects or diseases.”

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LEVITES.—JEWS.—DOGS.

“The *quality*, disease, or virtue of *inspiration* may be dormant in many generations, and yet appear again, as in the case of animals with instincts destroyed by domestication, and in insanity, gout, &c., which sleep for three or four generations.”

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“Is not the want of a religious instinct in the New Hollanders a proof that they are a distinct creation, as the kangaroo and *Ornithorhynchus paradoxus*?”

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“One sees in all this why the Jews were kept a pure people, and not permitted to marry strangers.”

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“Men cannot *image* or *typify* the feelings of religion ;

and the breathing of the Divine mind is still thrown upon sensible objects with which it cannot blend, but which it merely sets in motion. Like the pure air, which agitates equally the muddy pool, the clear lake, and the immense ocean, but is ever above them, and unmingled with them, it gives form to their waves, but does not change their substance; so inspiration can be made known to men only through terms connected with common life and popular ideas; and revelation must be an impulse of thought, or a peculiar association of ideas, and not a new creation of thought. Even in the Roman and Greek mythology, there seem to have been some vestiges or remains of this instinct.

“Prophecy or inspiration limited to particular purposes, not giving omniscience, and necessarily blended with the false knowledge of the mind.

“Glimmerings of divine light seem often to belong to the weakest intellects, and to have been exhibited in recent times.”

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“THOMAS THE RHYMER’S PROPHECY.

“Nothing so easy, in my theory, as to account for all the aberrations of the divine light, and even the necessity for this: its pure appearance in the primitive Christian church; its refractions by forms and ceremonies in the Romish church acting upon barbarians; the excessive zeal of the Reformers.

“Much of doctrinal absurdity in the freethinking or deistical school arises from Anthropogonism, as their supposing the divine mind similar to the human: but the largest and the smallest finite quantities are alike compared with infinity; and though there is a great difference between the intelligence of a Newton and an oyster compared with each other, yet there is none when



either of them is compared with infinite wisdom. The destruction of a world and the crushing of a gnat are alike insignificant when compared with infinity; and to make infinite wisdom and goodness after our models is absurd — more so than to expect a preaching ant, or a writing bee.

“We must believe that whatever has been once sentient will be for ever sentient, and has been for ever sentient; but the human intellect is by divine wisdom made acquainted with the past only as it may be useful to guide to the future; but I have some idea that conscience is a habit of mind, resulting from a previous state of existence.

“The child has used all its senses before two years old, and has cried and laughed, suffered and enjoyed; but all this is forgotten by the man. The oblivion of past being does not, however, destroy the consequences of its existence. The child forgets the accident of a fall, but the limb continues maimed. It will be no consolation to know that future punishment will be connected with an oblivion of the definite cause of suffering.

“It seems to be an axiom that what is *revealed* should be what cannot be attained by reason, and what often must be, or *appear* to be, contradictory to it.

“What appears most desirable to the child, the gilded toy, is despicable to the man; and how little the child cares for the objects of the ambition of the man!

“The flight of the quail and the migrations of the landrail are in fact miraculous, when the short habitual flight of these birds is considered.

“The meteoric stones in our time are a miracle of nature.

“Man is not intended to pry into futurity; and the

occasional miracles and gleams of prophecy seem intended to demonstrate divine interference or power.

“No mortal has seen any thing like creation, and no mortal being has received divine honours and lived long.—Alexander the Great.—Captain Cook.—Roman Emperors.

“Nothing so fatal as excess of power or happiness.—Napoleon Bonaparte.

“No proofs of the divine origin of Christianity in the purity of its doctrines, but decided proofs in the manner in which it began to exist, and in the history of its progress.

“It appears to me that the first process in an active and ingenious mind, when it begins to examine religious matters, is disbelief; the next doubt; the last belief. If we show the existence of something above experience or reason in animals, and prove from geological considerations man to be a recently-created animal, then instincts will be necessary for his early existence; and amongst these, religious instincts. Is it not probable that in the colder planets there is more intellectual life? In proportion as our planet appears to have cooled, so in proportion has it been fitted for higher forms of animal life.

“The number of moons round the distant planets, the belts of Jupiter, the ring of Saturn, all would require great intellectual power for the observation of their physical phenomena and determination of laws.

“Darwin, in his ‘Zoonomia,’ has endeavoured to prove that all instinct is reason. The fact of the ducks hatched under the hen instantly going to water overturns every thing he has written. There are myriads of other instances. The young turtles and crocodiles, hatched without care of parents, run to the water. The

crocodile bites at a stick, if it be presented to it the moment it is hatched.

“Habits that keep the mind in vigour are not formed in a small instant; and the sources of our lasting pleasures must be sought for deeply. The annual flower has not a deep or long-continued root, and its bright bloom is for a summer’s week; the mighty oak that slowly rises, sends its roots as far as its branches, and the heavens and earth share it alike.”

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“We have no idea of the creation of living beings; for nothing analogous occurs in the history of nature, and we see nothing except the successive generations of living beings, all *ab ovo*; yet it is certain that there was a period when most of the existing generations did not exist, and when races of animals were in being that are now extinct. In the former order of things we find a multitude of fishes, a few amphibia, a few birds and quadrupeds; but amongst the remains of life, no marks of an intelligent race of beings that had altered the surface of the globe in the way that man has done. Has such a race existed before man? Probably not; for some of his works would have been destroyed with more difficulty than the bones of fishes or the skeletons of birds. This can only be said of that great change produced in the matter of the globe by water, and which seems to have preceded the present order of things. A change produced by fire would have destroyed every thing belonging to life, even its organised forms; and would have left, in the place of order, beauty, and intelligence, a mere crystalline arrangement, the result of the chemical attractions of matter. That this was the state of the globe which immediately preceded the first appearance of the animals whose



remains exist in the aqueous formations, there is every reason to conclude; and that a destruction of the present order by fire may take place, is within the reach of probabilities.

“ But can such be the disposition of things, that the greatest and highest intelligence,—the results of the accumulated genius of man, operating through a long course of ages, and at length attaining something like perfection,—should disappear, and all the results be lost? Surely these results must attach to some other system, which belongs to a moral or intellectual scheme of things wholly different from the physical, and which coincides with the views belonging to Revelation.

“ Or, is even the highest perfection and aggregated power of the human mind a mere nothing compared with the immensity of intellectual combinations belonging to the universal mind,—a mere image in a dream, in relation to the whole living and acting universe? On all these subjects man is profoundly ignorant; yet some processes analogous to creation seem to have been recent. New Holland, for instance, contains races of animals found no where else on the surface of the globe; and it is impossible to believe either that they have been there from all eternity, or that they have been carried there by man.”

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“ POLITICAL REFLECTIONS, 1816.

“ It would be easy to show what science has done, what she might do for statesmen, and what statesmen have lost by not employing philosophers, rather than empty-headed declaimers, and empty-pursed cadets from the aristocracy.

“ Had there been one philosopher in the P. C., the expedition to Walcheren would not have been under-

taken. It required a mind as much in a fog as \* \*  
 \* \* not to know that the fogs of that country  
 were pestilential at the season when the expedition was  
 undertaken. Any philosopher would have warned  
 government against the importation of corn, which is  
 now weighing down the country by a diminished cir-  
 culation; and a tax upon foreign corn would have been  
 preferred, not a maximum. There would have been  
 no notes and no bankruptcies. Any philosopher would  
 have taught government the usefulness of the present  
 coinage, and would have advised them, instead of  
 buying bullion by sinking paper, to have taken six  
 millions of paper from the Bank, as a proper bonus for  
 the immense sums laid out by that body upon the  
 public. If coin was wanting, they should have obliged  
 the Bank to furnish it.

“ Were a philosopher in the cabinet, he could teach  
 ministers that a general want of money must be felt;  
 and that the general diminution of home consumption,  
 as to every article of luxury, is the cause of the increase  
 of the poor, and the misery of all classes which formerly  
 supplied the consumer.”

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“ The national debt, at least that part of it incurred  
 during the last war,—the greatest, the most astonishing  
 part,—was principally employed in exciting industry  
 and ingenuity at home. The money employed as sub-  
 sidies must have been either raised ultimately from the  
 labour of the people of these islands, or from produce  
 sent to these islands, entered as a debt, to be paid with  
 interest; but the foreign fundholders are very few: the  
 debt then is principally due for the labour of the  
 British. England does not produce gold and silver;  
 therefore the productive labour which raised 500 mil-

lions must have been enormous. The national debt called forth all the energies of ingenuity and industry. The gold we sent abroad was purchased by labour; and we sent abroad an immense quantity of produce, not of corn or wine, but of manufactured articles; the produce of our clays, our ores, and our wool. I am sure there is gross ignorance on every thing respecting this great question.”

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“The timid politician is like the timid physician; the one attempts, in every case, to meet the popular feeling; the other prescribes for symptoms. If a farmer neglect to cut his corn because there is a cloud in the sky, he will never have a harvest. In every kind of conduct general principles must be adopted.”

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“Every thing good in society has arisen from gradual reform and progressive change. When the leaves of the tree are blighted it kills the tree to pluck them off. Decaying leaves are better than no leaves at all: they should be suffered to perform their imperfect functions till they are thrown off by the vigour of the young and healthy leaves.”

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“The magnificence of a court, as long as funds can be found, and as long as the money is entirely expended in the country, is like brilliant sunshine, which in spring and summer raises the sap, causes it to circulate, the leaves to sprout, and the fruit to ripen; but in autumn, when the plant no longer receives any nourishment from the soil, it withers, dries up, and is destroyed.”

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“To raise money in a country, and spend that money



out of it, is like carrying off corn crops from a soil,—it must soon become barren.”

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“We hear the thunder, and unless we examine into the cause of it, some great catastrophe may take us unawares; we must inquire whether it is from the heavens or the earth,—whether it is caused by a tempest, which may soon be dissipated, or whether it is the forerunner of a volcanic eruption, which may deluge us with burning lava, not with transient rain, and destroy for ever our wealth, our cities, and our palaces.”

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“The friends of revolution do not, like powerful spirits, ride on the whirlwind, and direct the storm; they are generally the first victims of it. In endeavouring to sap the foundations of the building, they merely disturb some of the loose Gothic ornaments, which fall on their heads, and destroy the intermeddlers.”

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“That there is great distress and great discontent in the country, is at present a truth universally admitted. Even those persons who are most disposed to hope, and to see objects in sunshine, consider the present crisis not only as replete with difficulty and danger, but as leading to despair. There is a cloud hanging over us, and persons are as much divided in opinion with respect to the causes, as to the consequences of it. Some regard it merely as a summer cloud, resulting from the sunshine of our peace; others, as a winter cloud depending upon the chill of our taxation. Some expect it to be dissipated in a transient shower, and others hail it as the forerunner of a deluge which is to sweep away

our harvest, and to destroy our habitations. In such a season, it is natural to look to the government, not only for information, but for comfort ; but the persons at the head of affairs seem as little able to afford the one as the other. They have indeed talked of the inconvenience resulting from a transition to peace from war, and the ‘ignorant impatience’ of the people with regard to taxation ; but such opinions, vague, unsatisfactory, and insolent, do not dissipate doubts, or awaken confidence. The peace they have given us, may, indeed, be represented by an inverted and empty cornucopia, and the miserable are not likely to be soothed by being accused of impatience. To expect remedies from physicians who are ignorant of the nature of the disease they undertake to cure, is absurd. Nature, and a good constitution, might conquer the malady ; but it is not likely that natural means will be allowed, and the constitution has been already tampered with. The patient, under such circumstances, is right to find other physicians, or to give up physic altogether. On an occasion when those who ought to *direct* the public opinion seem unable to influence it, and when they irritate rather than soothe the public mind, it becomes the duty of private individuals to lend their aid. If the stranger who ‘fell among thieves’ was not succoured by his own people and race, he could not refuse the aid of the Samaritan.”

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“ Great proprietors and consumers consume in common years above an average quantity of produce, and therefore give premiums to agriculture ; and in years of scarcity they diminish their consumption. Their capital and their wants likewise excite to excellence in manufactures, and give facility to labour by exciting

excellence. They keep the standard in the inventions belonging to common life, and the ruder arts as well as the more refined, higher. Could we approach nearer to an equality, the comforts, *i. e.* the general mass of them in society, would be diminished. The tendency of improvement is to elevate together all the classes of society. Revolutionary systems, which pretend to bring men nearer to an equality, may indeed bring them nearer to a state of nature, but not to a state of happiness. Unhappily, experience has shown that their tendency is to make men savages, not philosophers. They are like a contagious or destructive fire, which consumes the crop; and not like a genial light or heat, as of the sun, which nourishes and ripens it.”

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“An obvious effect of diminished circulation is, that people who before were luxurious consumers, become frugal consumers.”

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“There is this immense benefit in machinery, that it carries on those operations which debase the mind and injure the faculties. A man by constantly performing the same operations, becomes unfit for any other. Machinery requires attention, intellectual exertion, and bodily labour of various kinds.”

I shall terminate these extracts with a little poem, which, I believe, was written during this period of his life. It displays the same habitual cast of thought as the preceding in prose, and the same sentiments relative to the spiritual nature of man and his destinies:—

The massy pillars of the earth,  
The inert rocks, the solid stones,  
Which give no power, no motion birth,  
Which are to Nature lifeless bones.



Change slowly; but their dust remains,  
And every atom, measured, weigh'd,  
Is whirl'd by blasts along the plains,  
Or in the fertile furrow laid.

The drops that from the transient shower  
Fall in the noon-day bright and clear,  
Or kindle beauty in the flower,  
Or waken freshness in the air.

Nothing is lost; the etherial fire,  
Which from the farthest star descends,  
Through the immensity of space  
Its course by worlds attracted bends,

To reach the earth; the eternal laws  
Preserve one glorious wise design;  
Order amidst confusion flows,  
And all the system is divine.

If *matter* cannot be destroy'd,  
The *living mind* can never die;  
If e'en creative when alloy'd,  
How sure its immortality!

Then think that intellectual light  
Thou loved'st on earth is burning still,  
Its lustre purer and more bright,  
Obscured no more by mortal will.

All things most glorious on the earth,  
Though transient and short-lived they seem,  
Have yet a source of heavenly birth  
Immortal,—not a fleeting dream.

The lovely changeful light of even,  
The fading gleams of morning skies,  
The evanescent tints of heaven,  
From the eternal sun arise.

His researches on fire-damp and flame were brought to a close in the beginning of 1817. During the following year he communicated to the Royal Society two papers—one, “New Experiments on some of the Com-

binations of Phosphorus ;” the other, “ On the Fallacy of Experiments in which Water is said to have been formed by the Decomposition of Chlorine ;” and this was the last time he felt himself called on to consider any objections made to the new doctrine.

Between the spring of 1815 and of 1818, he made several journeys to the north of England, and into Scotland, partly in connection with his researches relative to fire-damp, but chiefly for the sake of fishing and shooting ; and one of these excursions extended as far as the Orkney Islands.

Of the letters which he wrote during this period to his family, there are but few remaining, and they are chiefly confined to family matters, in which he always continued to take a lively interest, and retain all his early feelings. They are invariably kind and affectionate, and sometimes contain sentiments which to a pious and affectionate mother must have been very delightful. Thus in one, dated Kirkwall, Orkney Islands, August 12, after having freely given his opinions on a subject of some anxiety and doubt, he adds, “ I trust, my dear mother, that you will not have any anxiety in consequence of my opinions on this subject. It is our duty to make the best we can of this world ; and there is a Power far above our comprehension, who may produce good out of what appears for the moment an evil, and who never forsakes those who deserve well.”

In only two of these remaining letters does he allude to the safety lamp. Thus in one to his mother, dated Bath, October 27, 1816, evidently in reply to some inquiries, he writes,—“ It is true that the colliers are getting made for me a piece of plate. I know not the value of it, nor do I care much ; it is not to be less than

one thousand guineas. But it is the nature of the present, for saving the lives of my fellow-creatures, that I value." And in another, dated London, May 25, 1818, in which he acquaints her with his plans for another journey on the Continent—undertaken chiefly on account of two objects—the extending the use of the safety lamp, and the hope of benefiting literature by attempting by chemical means the unrollment of the Herculaneum MSS., he says:—"We are just going upon a very interesting journey. I am first to visit the coal miners of Flanders, who have sent me a very kind letter of invitation, and of thanks for saving their lives. We are then going to Austria, where I shall show Vienna to Lady Davy, and then visit the mines; and lastly, before I return, we are going to visit Naples.

"I have the commands of his Royal Highness the Prince Regent to make experiments upon some very interesting ancient manuscripts, which I hope to unfold.

"I had yesterday the honour of an audience from his Royal Highness, and he commissioned me to pursue this object in the most gracious and kind manner.

\* \* \* \* \*

"We shall be absent some months."

On the 26th May he quitted England, on his second Continental journey: he passed through Austrian Flanders into Germany, descended the Danube from Ratisbon, and arrived in Vienna about the 13th June.

He set out from Vienna in the first week in July, and passing through part of Hungary, proceeding southward, he made various excursions in Stiria, Carinthia, and Carniola. He was delighted with the mountain, lake, and river scenery of these Alpine regions; and now formed an attachment to the country



which lasted during life, and more than once induced him to revisit it.

As the hot season drew towards a close, he entered Italy by the Friul, and visited Venice, having previously made a little voyage in the Adriatic to Pola in Istria.

From Northern Italy he crossed the Apennines in the beginning of October, and arrived in Rome about the 13th of that month.

I cannot find any notes preserved of this journey: in his "Consolations in Travel" many allusions are made to it, all with the same unqualified feeling of enjoyment; and in a paper which he contributed to the Royal Society, written soon after his arrival at Rome, "On the Formation of Mists in particular Situations," he incidentally mentions the course which he pursued, in connection with his observations on the phenomena which it was his object to explain.

After a very short stay at Rome, he visited Naples, and began his researches on the Herculaneum MSS. His first results were of a very encouraging kind, confirming the expectations which he had previously formed from some trials which he had instituted in England. In a letter to his mother, written on his return to Rome, dated February 25th, 1819, he says:—

"We have been in Naples, and I have been perfectly successful in the object of my journey." He adds, "I am not certain about the time of my return to England. This will depend upon the determination of our government respecting a plan which I have sent them, connected with my success at Naples, and which will probably bring me to England in the summer."

Contrary to the expectations thus expressed, he re-

mained on the Continent. He spent the early part of the summer in a tour to his favourite regions in the southern states of Austria. Of this tour, which was a rapid one, and chiefly undertaken for the sake of fishing and shooting, he has left a pretty copious journal, the greater part of which I shall insert.

He set out on it from the baths of Lucca on the 22nd of June, in a caratella, and two post horses, with his servant and his two dogs. By posting he rapidly crossed the Appenines and the plain of Lombardy. He quitted Italy by way of Verona. On the 26th he was at Roveredo, at the entrance of the Tyrol.

“27th.—Went off this morning at six to the top of the Lago di Garda, two posts; the temperature at Roveredo was  $74^{\circ}$  to  $75^{\circ}$ . After we had crossed the Adige, it fell to  $73^{\circ}$ ; and there was a strong breeze from the lake. Passed by the villa of Count Castrobarcha, with a pretty lake surrounded by mountains, and sending a small tributary stream to the Adige. When we got upon the hill above this lake, the Lago di Garda broke in upon us with great magnificence, of a bright sapphire tint; and this tint, contrasted with the red and dun colour of the limestone cliffs of the mountains above it, on which white clouds were moving, gave great beauty and grandeur to the scene. The river, which was one of my objects, was turbid from the melting of the snow; but I saw a number of the trouts taken in it from forty to three pounds. They are evidently a trout having habits which lead them to feed in the lake, and then mount against the stream to spawn. They are all fat and silvery in their colour, and I think the best fish I ever tasted. The common trout, which is brought down from another river near Rivo, and which is exactly our river trout, ill fed, they call *car-*

*pione*. The trout of the Lago, and of the river which runs by Tubione, are like those of the Colne, and have hardly any spots.

“The general geological aspect of the country in the neighbourhood of the Lago di Garda, is like that of Illyria; the same great masses of limestone, and a similar stratification. The picturesque aspect is not unlike; but here the olive and the vine clothe the sides of the hills, and the chesnut and the oak rise to the tops of the mountains; and in Illyria, the beech and the oak occupy the hills, and the pine is the tree of the mountain. Rivo, I think, would be a more agreeable place for summer than the baths of Lucca; for there are trout, coturni, pernice, galline, and the great *coc de Bois*. Is this a fable of the host? Yet, Dal Armi told me they were found near Trent.

“28th.—Passed rapidly through Trent; saw Dal Armi, who told me that the pitzardone was found in the Tyrol, probably in the marshes above Trent, in the end of July and the beginning of August. Clouds began to gather upon the mountains, and rain effectually cooled the air, and prevented my newly repaired wheels from taking fire. Got to Bolsano, and slept at the Kaiser Krone, a tolerable inn. A thunder-storm kept me within doors. This is called an Italian city, but its population is German; not one person out of ten speaks Italian.

“29th.—Left Bolsano at seven; a beautiful morning. Saw the clouds which remained, the remnants of the storm, rising up the snowy crags and cliffs, and pine covered sides of the stern mountains. Passed several torrents with some little difficulty: found the scenery near Brixen inferior to that close by Bolsano; but on leaving Brixen and taking the Carinthian road, it became very



grand. This branch of the Eisach foams over rocks amongst green meadows and vineyards; and a few chesnuts, and walnuts appear in the green fields, and the dark pine is above. Slept at a genuine Tyrolese inn; civility, cleanliness, and all the comforts of the best English country inn; all the attendance by women. The postmaster, the innkeeper, and, how I know not in a country so little travelled through, every thing seemed to be in order. I suspect the country people make great use of these inns, for I saw numerous parties eating and drinking.

“30th.—Slept at Silliane, after a very pleasant day’s journey; ascended through meadows to the spot where the waters part, and saw to the east the source of the Drave, a beautiful limpid stream; and to the west that of the Eisach. Above the Brunneken, the mountains are very grand and bold, and immense masses of snow covering them to their apparent bases, so that they looked like the snowy Alps in winter. The temperature of the air from  $48^{\circ}$  to  $60^{\circ}$ ; that of the Eisach, where it is a small stream,  $52^{\circ}$ . Below the Brunneken a magnificent chain of mountains is seen to the south or the Italian side, and accompanied my view all the way to Silliane, which is on the banks of the Drave, a stream here containing no hucho, but trout and grayling. These mountains appear of granite, and excessively bold and precipitous; very like the needles in the valley of Chamouni, and bearing almost the same relations to snow, which lay in immense masses, even at their juncture with the pine-covered hills.

“July 1st.—A very fine day. In the morning the thermometer at half-past six at  $55^{\circ}$ ; it rose towards two o’clock as high as  $65^{\circ}$ . Fished in the Drave and the stream that joins it below Silliane, and caught

fourteen or sixteen trout and grayling. Observed that the fish lay more in the still pools near the great river, and in the divisions of the river in water meadows, where they are not so liable to be carried off by the rapid torrent. The hucho does not rise so high as this; the grayling were larger than the trout; one near a pound. My host's son, who spoke Italian, and a little French, did the honours of the house with infinite civility; and the people in general seem an excellent race, not interested, courteous in manner, and independent in character.

“2nd.—It rained in the beginning of the night: thermometer at my window this morning at seven at  $56^{\circ}$ , and it rose to  $60^{\circ}$  in the sun. Left Silliane. My bill amounted for the two days to ten florins\*; and including a bottle of Wurtzburg wine, two florins. The valley of the Drave became warmer as we approached Lientz; the river was turbid from the rain of last night; and in summer, I was informed, is rarely clear. Either the heat melts the snow, which occasions a flood, or the clouds bring rain. The town of Lientz is near the confluence of the Drave with the Isel; and the Isel is much the larger river of the two. It was more transparent than the Drave, but had that blue milkiness which I have always found indicating a snowy origin. The little plain of Lientz, surrounded by hills and mountains, is extremely rich, and its temperature so much higher than that of the valley above, that Indian corn ripens; and some rye was already cut. The day was cloudy and showery, yet the thermometer stood at  $64^{\circ}$ . The temperature of the Isel,  $54^{\circ}$ . The prospect of bad weather induced me to give up the idea

\* The florin is equal to 2s. 4d. of our money.

of going to Heligoblate and to the Glocknee; and I was informed that this was not the season for the hucho, that they are found or caught only in spring and autumn. I saw none; and went to Overdranberg, where I saw some large grayling in a little stream of beautiful clearness tributary to the Drave. The inn did not tempt me, nor the offer of showing me some hares to shoot, made by the innkeeper; and I went through the same kind of scenery to Grieffenberg, where I found a good inn, and had a hucho of about two pounds and a half for dinner. It is like an ill-fed trout, but has no spots; is much longer, and perfectly silvery; its skin remarkably thick; its taste hardly different from that of the trout; it did not calver much, but probably it was twenty-four hours old. The hucho that I ate at Gratz last year calvered like salmon. I walked by the side of a beautiful stream that rose up through a glen covered with pines, and fell over rocks, making some fine cascades. The valley here is well cultivated, extremely green, and the haymaking going on. I tried in vain for hucho; but seeing a landrail, and hearing some quails, I brought down the dogs; found the landrail, and shot it, and shot two quails; but gave up the sport, for they were too young.

“4th.—Came on to Saxenberg, where I took a twelve o'clock dinner,—soup, salad, and veal cutlets, and Illyrian wine; expense, 1 florin 14 kreuzers\* for myself and servant. Looked at the Muhl; a clear stream, with a little snowy milkiness, as large as the Ischil. Saw no huchos. The scenery of the valley of the Mol or Muhl is very fine, and bounded by snowy mountains. Came on to Spital, and walked to the

\* The kreuzer is equal to about  $\frac{4}{10}$  of our penny.



Mulhstadler-see, from which a beautiful clear stream joins the snow-tinted Lider, and makes its blueness more transparent. The Mulhstadler-see beautifully clear, and commanding fine views of the snowy mountains of the valley of the Lider. The scenery about Spital contains much of beauty and of grandeur. Caught in a half hour, in the Mulhstadler river, ten trout, some  $\frac{3}{4}$  lbs.; they did not cut red. Saw a number of small perch in this river. German women. Tyrolese Catholics. Lost my passport. Temperature this day from 75° to 80°.

“5th.—Came on to Villach, where I slept. Temperature in travelling from 80° to 86°; in the inn at Villach, a large room, about 73° or 74°. In coming down upon Villach, left the micaceous schist chain of mountains, and had a fine view of the calcareous chain of the Loikel, with Mount Craie rising above the rest, snow still remaining in the hollows of its conical summit; and to the west of it, the highest of this boundary chain on the road to Tarvis rose in great majesty, its limestone peaks covered with snow.—Drove to the Osiacher-see, about three miles; a piece of water of no great beauty, except when it was brought in front of the great mountain chain; a slow stream issued from it full of coarse fish, but I saw no trout. Barbel, roach or dace, in abundance. I did not observe the goitre much in the valley of the Upper Drave; but here, and on entering the valley of the Muhl, it becomes so common that every second woman has it, at least those past twenty-eight. The Carinthian women have fine arms, which they expose, and fair hair. I once thought a part of the Italian character, their indifference to human life, depended upon their constant familiarity with statues, images, and pictures in which death and wounds are

represented; but in the Tyrol, wooden images of Christ and the two thieves, as large as life, and with blood and wounds in abundance, are constantly seen on the roads; and yet this people is the freest of all from the crime of assassination. I think the exposure of the human body and face, as we see in Italy, at funerals, has a bad effect on the mind.—Temperature of a warm bath near Villach 84°.

“6th.—Set out for Wurtzen at half past six. The thermometer was already at 75°, and it rose to 80° and 82° on the road. Crossed the mountain-stream which divides Carinthia from Carniola, and saw the mountain which furnishes the molybdate of lead,—an immense mass of yellow and red limestone. The view in coming into the valley of the Save very fine. Immense mountains of limestone, precipitous and rugged; pines reaching about two-thirds up, and immense masses of snow in the hollows. In coming within the influence of the snow the thermometer fell to 78°. Found the inn tolerable, and the Save a fine trout stream; so I staid to fish, and to examine the source of this beautiful water: caught eight trout, one of them at least a pound. Found the temperature at the bridge 60°. It rises about a quarter of a mile above Wurtzen, and must have a temperature about 50° or 52°; for I had no thermometer. It gushes forth from a number of small holes, and where it first rises may be leaped across; but it soon enlarges, and forms a beautiful clear lake surrounded by rushes, and in which there are wooden houses for shooting wild ducks at the time of their passage. The mountains round this place are very grand on all sides. The road to Tarvis, and so on to Porteba and Udino, only a post and a half off; so that it is easy to go from this place to Udino in a day. The

meadows very green, — the hay making; heard no quails, but some landrails, and my dog found one. The wild ducks do not breed here, nor snipes; but they migrate here in the beginning of August. The common language is Sclavonic. The whole chain of the Carniola mountains on the side of Carinthia is distinguished by its beeches; it rises to 3000 feet, or 4000 feet. Temperature, until two o'clock, 80°. After, it became cloudy and the thermometer fell to 76°, to 74°, and at last to 70°; and in-doors, at ten, it was 68°.

“7th.—Temperature of the air on the road from 78° to 91°; generally 91° in the little close villages, and from 84° to 86° on the road. The road from Wurtzen to Ratmanskdorf very beautiful; fine views of the two chains of mountains, those of Carinthia, the Loibel, and those of Carniola, having Mount Terglon for its highest point. That branch of the Sava which I followed down is called the Krainer Sava; the other, which has its origin in the Wolkshumer-see, is called the Wolkein Sava. Went out of the post road at Asling or Sava to go to Ratmanskdorff. This is one of the most beautiful drives I have seen. The plain between the two chains of mountains is elevated on the side where it meets the Carinthian mountains above the valley of the Save, and is rich in pasture, with clumps or hedgerows of trees,—walnuts, ash, elms, chesnuts, limes, and beeches. It is like an English nobleman's park, with an intermixture of corn, clover, and maize. There is a fine cliff to the right topped by a picturesque castle, and one range of broken hills, and four distinct ranges of mountains; the last the bare and snowy Terglon. Through the valley the Sava winds; and the meeting of the two waters, the one bright blue, the other sea-green, is distinctly seen. The lowest hills have the same vegetation as the



plain ; the next range, oak and beech ; the third, pines ; the fourth, pines and bare rock ; the fifth, without any appearance of vegetation, cliffs of marble or masses of snow. By the sides, or upon the bases of the hills, are seen beautiful villages, with white spires rising amidst the trees. Man seems here capable of enjoying life ; animated nature is gay, and inanimate nature beautiful and sublime. I was received at the house of a shop-keeper who entertains strangers as an innkeeper. I found the beds good, the Carniola wine excellent, and the *cuisine* not bad, and abundant. Two persons only in the village spoke Italian, and a few German. My guides were Slavonians ; and, except that I could not understand them, very good guides. I fished this evening in the Sava ; it was exceedingly hot. Thermometer above 80° till nine o'clock. I took nine small trout and grayling ; the grayling I found excellent. Thermometer at twelve, in my room, 72° ; at six in the morning, 70°.

“8th.—Went in a caratella to see Maria-see, a lake about six miles off : the country of the same kind, and views similar to those of yesterday ; both chains of mountains seen from the lake, which is clear and beautiful, surrounded by cultivation. On a small island, with a white church, and houses surrounded by trees, the cliff and castle, which I saw yesterday in the distance, rise out of the lake as at ———. I have seen no small lake more beautiful ; it abounds in fish, the best of which are the waller (*silurus glanis*), and carp. I bought a waller of two pounds for a twenty kreuzer piece. It is a fish very like a barbot, but grows to an immense size ; had no back fin, but a small antenna instead, and has an immense mouth. Temperature was from 80° to 90° on the road, and is now in the shade at

my open window  $87^{\circ}$ . Returned by the Wolkhein Sava. The views up the valley are very beautiful. By shutting the window I have reduced the temperature to  $76^{\circ}$ . I saw yesterday the May-fly, green and grey; but the fish did not seem to take them. I have seen no fire-flies since I left Bologna; none on the Veronese road, which I travelled late. Is the season over, or does the neighbourhood of the Alps interfere? Yet I saw them at Domo D'Ossola, even in the end of June (about the 24th or 25th).

“The waller I have just eaten (two o'clock), for I have adopted the habits of the country (twelve is the dinner hour), and I do not think it pre-eminent; very like a whiting: softer than a barbot, but good and clean tasted. The wine of Carniola is excellent, both here and at Adelsburg and Planina; it is probably the same, for they call it “Welsh,” which I presume means *foreign*. I got some “*iron forte*,” cast iron, from Sava, to ascertain if it be not an alloy of silicum. All the mountains here are calcareous. Left Ratmansdorff at two o'clock. The afternoon was intensely hot, thermometer from  $88^{\circ}$  to  $93^{\circ}$ . The views of the Sava of the same kind as those about Ratmansdorff. About two miles before I reached Kranburg, the highest of the Carinthian chain of mountains came in view; its sides still spotted with snow, and evidently limestone. It is on the right of the pass of Loibel going into Carinthia. I saw fire-flies in great abundance; they appeared less luminous than those of Italy. I now am almost certain I saw one in the valley of the Drave—I think about Villach. Came to a new inn at Laybach, Dettila's. At Kranburg I came upon the Sava at its confluence with the Zura. These two rivers, when I could not reach them, fixed my imagination, and awakened the brightest visions of

the angler; within my power, I lost the appetite; and I was already tired of fishing for small fishes in a burning sun, and I saw no hucho. But human life has its best part in pursuit,—happy when its objects are useful or innocent. Got to Adelsburg at nine o'clock; the Chernitz-see was full of water, so that I could not see the bocca. Between Laybach and Loitch the heat was intense; the thermometer rose to  $97^{\circ}$ , and was never below  $92^{\circ}$ . A friendly thunder-storm came on whilst I was at Loitch, and the wind blew from the Alps; so that after three o'clock it was tolerably cool.

“10th.—The same cool breeze continued. Came to Wippach, where I found a fine trout and grayling stream, and stopped. I caught two grayling and seven trout this evening. The trout averaged half a pound a-piece, and one of the grayling must have been nearly two pounds. The stream rises from the limestone rock, and, as I was informed (for my thermometer is broken), is  $60^{\circ}$  or  $70^{\circ}$  in temperature. The country here is pretty, and a very neat clean inn.

“11th.—It was very hot; but a breeze of wind at nine o'clock induced me to try fly-fishing. I hooked four large trout, and landed two; one must have been above two pounds, and cut very red. The May-fly was on the water; and yesterday evening, the duncat, the alder-fly, with May-flies, and all the insects known in June, and the beginning of July in England. This is the best fishing stream I have seen on the Continent. There are stags and roes in the woods above, and *caturni* close to the town; but they are very difficult to kill. I saw near Planina the river which is supposed to empty the Urking-see. It issues, like many of the rivers of this country, from a bed of limestone. The duncat was on the water this evening, and an infinite



variety of flies. I began fishing at five o'clock, and soon caught four very fine trout above a pound a-piece, and one above two pounds. I caught these with very large flies, the peacock-body and redwing; I changed my fly to the red hackle with orange body, and caught a grayling and a trout of three quarters of a pound, and one of half a pound, and one of one pound. I then changed for the peacock harle, red hackle, and white wing; and caught six noble graylings, all but one above a pound, and one above two pounds. Altogether sixteen fish this day, and I hooked a great many more; by far the best day's fishing I ever had in July. I saw a trout of at least six or seven pounds, but he was in stagnant water. Heard this day, for the first time, of a comet. The wine is excellent.

"12th.—Came on to Gortzen, and received all possible hospitality from the Comte de Thunn. It was still hot, but a thunder-storm in the evening reduced the temperature considerably. The views upon the Sonzo are extremely beautiful; wild mountains, with rich plain and valley scenery, and the cultivation of Tuscany. The corn was cut, and the ground ploughed up for a new crop, and the Indian corn higher than my head.

"13th.—Went this day to the Count's villa, and spent the day there; looked for game in vain in the morning, but had some magnificent views of the country from the heath and chesnut-clothed hills above the villa: went out to fish after dinner, and caught a trout immediately; but a thunder-storm came on, with hail-stones as big as nutmegs, and put an end to my sport, or I should, probably, have caught very large trout in this magnificent river. I saw one rise of at least four pounds, last night; but such a storm I never saw

before : the lightning was incessant, and it rained, hailed, then thundered, for at least three hours."

On the 14th he left Gortzen, and, descending from the mountains, hastened back to the baths of Lucca, by Padua, Ferrara, Bologna, and Florence, where he arrived at one o'clock in the morning of the 18th or 19th, and where his journal terminates.

The remainder of the summer and the beginning of the autumn he passed at the baths of Lucca, which, from their mountainous situation, afford a pleasant, cool, and wholesome retreat from the heat and malaria of the plains and valleys of Italy.

The principal memorials of his sojourn at this beautiful spot which occur in his note-books are of a poetical nature, very similar to those out-breakings of feeling, sentiment, and reflection, which have been already given, relating to his first journey, and not less forcibly expressing his love and admiration of nature, the fervour of his conceptions, his sympathy with what is most affecting in the beauties of nature, and his lofty aspirations and imaginings. I do not think it right to keep back these remains ; and they may be more interesting and acceptable, from having been composed without any view to publication, and from being, as most of them are, in an unfinished state :—

"TO THE FIRE-FLIES.

"Baths of Lucca, 1819.

"Ye moving stars that flit along the glade !  
Ye animated lamps that 'midst the shade  
Of ancient chesnuds, and the lofty hills  
Of Lusignana, by the foaming rills  
That clothe the Serchio in the evening play !  
So bright your light, that in the unbroken ray

Of the meridian moon it lovely shines.  
 How gaily do ye pass beneath the vines  
 Which clothe the nearest slopes! how thro' the groves  
 Of Lucca do ye dance! The breeze that moves  
 Their silver leaves, a mountain zephyr's wing,  
 Has brought you here to cheer our tardy spring.  
 Oft had I seen ye 'midst thy orange bowers,  
 Parthenope! and where Velino pours  
 In thundering cataracts; but ne'er before  
 So high upon the mountains, where ye soar  
 E'en in mid air, leaving those halcyon plains  
 Where spring or summer everlasting reigns,  
 Where flowers and fruit mature together grow,  
 To visit our rude peaks, where still the snow  
 Glitters e'en in the genial month of flowers.  
 But brightly do ye move in fiery showers,  
 Seen like the falling meteor from afar,  
 Or like the kindred of the erring star.  
 May not the stars themselves in orbits whirl'd,  
 Be but a different animated world,  
 In which a high and lofty breath of life,  
 Of worlds and insects calms the wakening strife,  
 Commands the elements, and bids them move  
 In animation to the voice of Love!"

---

"Thou loveliest form of the celestial world,  
 When in the circle of thy brightness  
 Thou sheddest in the blue unclouded sky  
 All thy meridian lustre! in the north,  
 Above the heath-clad mountains have I seen  
 Thy clear and mellow light; and when the waves  
 Of the Atlantic raised their foaming surge  
 Against the eternal rocks, where fabled sleeps  
 The last of western Titans—then, when young  
 In mind, and light of heart, thy rays had power  
 To solemnize and tune to thoughts sublime  
 My vagrant spirit; *now*, in these fair climes,  
 Where in a purer and more balmy air,  
 And in a sky whose tints of ether seem  
 Giving a saint-like glory to thy rays,  
 Thy influence is e'en stronger in a heart  
 Wearied, but not yet broken or subdued.



Though many chequer'd years have passed away  
 Since first the sense of beauty thrill'd my nerves,  
 Yet still my heart is sensible to thee,  
 As when it first received the flood of life  
 In youth's full spring-tide ; and to me it seems  
 As if thou wert a sister to my soul,  
 An animated being, carrying on  
 An intercourse of sweet and lofty thoughts,  
 Wakening the slumbering powers of inspiration  
 In their most sacred founts of feeling high."

---

"The tempest gather'd on thy verdant hills,  
 O Lusianno ! The azure southern sky  
 Was dimm'd by fleeting mists. Soon the dark cloud  
 Form'd more compact, and to the zenith rose ;  
 The bright blue of the northern distance then,  
 And all the mountains show'd their shaggy crests  
 Of ancient chesnuts, dark and deep in shade.  
 To the feverish flush of the meridian sun  
 Succeeded quick a damp and sudden chill ;  
 The lightning flash'd. At first, a feeble light,  
 Scarce seen, even in the darkest part of heaven,  
 Succeeded by low murmurings ; brighter gleam'd  
 Each flash that follow'd, and now louder roar'd  
 The thunder distant, but it soon became  
 The loudest burst of heaven's artillery."

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"The whirlwind gone,  
 A calm, a soothing freshness soon succeed.  
 Thus in the mind springs new-born energy,  
 ———— Thoughts that were dead are roused,  
 And all the purer being wakes again.  
 The slime of foulness and impurity  
 Are borne into the ocean deep of reason,  
 And new creations dance upon its waves,  
 E'en as they purify—a thousand forms  
 Of beauty, and of goodness, and of grace.  
 The intellectual soul, freshen'd by dew  
 From heaven, enrich'd, is glad and green with life."

---

"Again that lovely lamp from half its orb  
 Sends forth a mellow lustre, that pervades  
 The eastern sky, and meets the rosy light

Of the last sunbeams dying in the west.  
The mountains all above are clear and bright,  
Their giant forms distinctly visible,  
Crested with shaggy chesnuts, or erect,  
Bearing the helmed pine, or raising high  
Their marble columns crown'd with grassy slopes.  
From rock to rock the foaming Lima pours  
Full from the thunder storm, rapid, and strong,  
And turbid. Hush'd is the air in silence ;  
The smoke moves upwards, and its curling waves  
Stand like a tree above. E'en in my heart,  
By sickness weaken'd and by sorrow chill'd,  
The balm of calmness seems to penetrate,—  
Mild, soothing, genial in its influence.  
Again I feel a freshness, and a power,  
As in my youthful days, and hopes and thoughts  
Heroical and high ! The wasted frame  
Soon in corporeal strength recruits itself,  
And wounds the deepest heal ; so in the mind,  
The dearth of objects and the loss of hope  
Are in the end succeeded by some births  
Of new creative faculties and powers,  
Brought forth with pain, but, like a vigorous child,  
Repaying by its beauty for the pang."

In regard to the pursuit of science, this summer appears to have been passed almost in inactivity. The only inquiry that I can find he engaged in was the examination of an ochreous substance, which is pretty abundantly deposited from the water of the hot baths of Lucca, and on which he communicated a short paper to the Royal Academy of Sciences of Naples, republished in the 19th volume of the "Annales de Chimie et de Physique."

On the approach of winter he returned to Rome, from whence he again visited Naples, where he arrived on the 1st of December, with the intention of remaining two or three months, for the purpose of completing the object of his journey.

Both the results of his inquiries relative to the Herculaneum MSS. and the nature of volcanic action, the two principal objects he had in view, he communicated to the Royal Society in 1821 and 1827, under the title of "Some Observations and Experiments on the Papyri found in the Ruins of Herculaneum," and "On the Phenomena of Volcanos."

From unforeseen circumstances, the first investigation has proved more interesting to chemistry than to literature; as displaying the effects of time, the changes and combinations which may result from the elements of vegetable matter acting on each other, and as tending to illustrate some important phenomena in the economy of our globe, and how effects very analogous (I allude to those of carbonisation) may be produced by causes totally different and opposite.

Previous to mentioning the results of his observations on the phenomena of volcanos, I shall insert a description of a volcano in activity, which occurs in one of his unfinished dialogues. The speakers are supposed to be on the summit of Vesuvius, waiting the rising sun:—

"*Arch.*—It is now almost the time when we should perceive the dawning of the eastern light; but from those heavy clouds which obscure the whole of our horizon, and from the long-continued and dead stillness of the mountain, I suspect that we are on the eve of some great change, and a storm, if not an eruption, is approaching; so I think it will be prudent for us to return to Naples. (The party return to Naples.)

"*P.*—It would have been too much to have expected in twenty-four hours, and after so splendid a sunset as



we witnessed last evening, the re-appearance of that glorious luminary, under the same brilliant and beautiful circumstances. But the storm which you augured does not yet fall. There is a peculiar heat in the air; and the sea, though there is no breath of wind, seems to roll waves almost as black as pitch, from the reflection of the sky towards the shore.

“*A.*—Surely I felt at that moment a motion of the ground beneath me. And, hark! the bells of the churches tinkle; it must have been the first shock of an earthquake!——

“*All.*—We felt it.

“*A.*—Watch the mountain! See the pitchy cloud on the top of it bursts open, and a column of flame, and a jet of lava, and red-hot stones rise into the middle heaven. The ground again shakes! and, lo; the tremendous thunder of an eruption!

“*P.*—Lo! the lava bursts from the top! And watch the skies filled with flame;\* a river of fire descends to the earth! I give you joy, Archæus, that the wish you have so long indulged is gratified, and that you will have an opportunity of examining and studying the results of a volcanic eruption. But the lightning now flashes from the thick clouds into the flame of the volcano, and the thunders of the heavens respond, as it were, to the noise of the subterraneous artillery; the rain falls in torrents, and a thick cloud, which, from its extreme darkness and opacity, must contain stones or dust, is approaching towards Naples! We must wait for another day to make our visit to the mountain;

\* The word “flame,” as used above, should not be received in its chemical sense. I am not aware of any well recorded instance of flame, *i. e.* volatile matter burning, amongst the phenomena of a volcanic eruption;—the fiery sky is usually the effect of the ignited ashes.

it would now be a service of danger to attempt to approach it."

"( *Change of Scene—The Base of Vesuvius.* )

" *A.*—The violence of the explosion is now over. Though the clouds still cover the top of the mountain, yet I think we can ascend to the spot whence the lava issues as from a fountain. And what a magnificent sight is this river of fire, nearly half a mile in length, and in some places fifty yards broad!

" *P.*—It would be still more magnificent in the night, when its high temperature would be more apparent, and when the dense white smoke rising from it would appear like flame from the reflected light. The appearance of the lava does not correspond to what I had expected to see. It appears liquid only at its exit from the mountain; and, though continually moving on, it soon loses its character of a river of fire, and appears only a shapeless heap of enormous slags, covered with ashes, and destroying every thing it meets in its course.

" *A.*—The fused lava soon cools, from the effects of the atmosphere at the surface, and forms those large masses of scoria; the liquid still moves on below, being pressed forward by the new portions thrown from the fountain. But in a dark night all these masses would appear more or less luminous."

This description is not imaginary; it is, I believe, a faithful account of one or two scenes which he witnessed in the winter of 1819 and 1820, when the mountain was even more active than in 1814 and 1815, and more favourable for the inquiries he was anxious to institute, relative to the powers on which volcanic action depends.

These inquiries were directed to the hypothesis, which he advanced after the discoveries he made in 1807 and 1808, that the fixed alkalies and earths are metallic bases united to oxygen, and in their uncombined state possessed of such a powerful affinity for oxygen as to be capable of decomposing water. Many facts, previously well known, in connection with active volcanos, were not unfavourable to this hypothesis; some negative sufficiently confuting all former hypotheses; others positive, as the nature of the matters ejected, the lava and cinders composed of the oxidated bases of the earths and alkalies; and, as the almost general fact, that water is concerned in volcanic eruptions.

Now, were this hypothesis correct, it was probable that conclusive proofs might be collected in carefully examining the phenomena of an eruption and its products; it might be expected that inflammable air might be detected issuing from the volcano, or rising in flame, or that some pure or uncombined alkaline or earthy inflammable bases might be discovered entangled in the lava. The results of his inquiries directed to these points were negative. In none of several instances in which he experimented on lava, when freshly poured out, and in a liquid ignited state, could he detect any traces of inflammable matter. He expresses the results very briefly in his "Consolations in Travel." Referring to the hypothesis in question, he observes, "I made many, and some dangerous experiments, in the hope of confirming this notion, but in vain."\*

\* The phenomena of the volcano of Stromboli may be adduced as unfavourable to the hypothesis in question. Supposing that its eruptions depend on chemical causes,—why have they not long since ceased,—why have they continued for so many centuries almost perpetual? It might be supposed, that after the oxidation of the metals, on which the fire of the



The subject of volcanic fire is altogether mysterious; and it will probably remain a mysterious problem till we are better acquainted with the nature of heat and of the other imponderable or etherial agencies,—whether they exist as distinct powers or substances, or are merely modifications of some one subtle element or influence. How the light of certain animals, as of the fire-fly and glow-worm, and the innumerable tribes of animalcules which inhabit the ocean, is produced; how animal electricity, as that of the torpedo, gymnotus, and silurus, is generated; how the sun and fixed stars are for ever emitting heat and light;—these are problems, all equally unsolved. But being more in the ordinary course of nature, they do not excite ordinary curiosity and a desire to explain them, in the same degree as the fire of the volcano and the shock of the earthquake, which are witnessed rarely and occur unexpectedly. Were the latter daily occurrences in every

volcano is imagined to depend was effected,—that there would be a cessation of all action and perfect rest. Farther, it might be supposed, that if the fire of this volcano was owing to the oxidation of metals by means of the decomposition of water, that hydrogen would appear in large quantities, amongst the products. The narrowness of the vent,—the situation of the volcano, isolated in a deep sea, at a great distance from land, are circumstances exceedingly favourable, to the evolution of hydrogen. But no *flame*, I believe, has ever been seen proceeding from the crater; at least, I have never heard that it has been witnessed, and I have made particular inquiries on the subject,—as well as carefully watched for it.

I may add, that the absence of iron in its metallic state, amongst the product of volcanos, so abundantly ejected in the first degree of oxidation, is very unfavourable to the idea that large quantities of inflammable gas are evolved in volcanic eruptions, or even disengaged. Were this oxide acted on by hydrogen at a high temperature, what is there which could prevent its decomposition? and if reduced, we might expect to discover it in this state, at least occasionally, enveloped in and protected by lava.

country, they would excite probably as little attention as the heat of our fires and the light of our lamps; had every region its volcanic mountain, we should, like the inhabitants of Stromboli at present, as I learned when I visited that remarkable islet, be alarmed only when the mountain is still.

My brother quitted Naples early in spring. In a letter to his mother from Rome, of the 13th March, he says, "John is, I trust, now on his passage homewards from Ceylon. We are so far on our return, and I hope in the autumn we shall meet from different quarters of the world at Penzance. I have finished with success, and much sooner than I expected, the objects for which I came abroad. Lady Davy is not very well, and we are obliged to travel slowly; but I hope we shall be in London in the end of May or beginning of June. We shall return by the south of France."

On my arrival in England, on the 20th June, I had the satisfaction of meeting him; he had returned a few days before.

It was his intention this autumn to have paid his friends in Cornwall a visit. When expecting his arrival at Penzance, I received from him the following letter:—

"Grosvenor Street, Oct. 19.

"MY DEAR JOHN,

"I had intended to leave town for Cornwall to-morrow; but I have been caught by an inquiry of the greatest importance, and till I can conclude I cannot stir.

"I have ascertained (repeating some vague experiments of Ørsted's) that the *voltaic pile* is a powerful magnet; *i. e.* that by the union of the + and —

electricities, magnetism is produced in the same combinations as heat. I am deeply occupied with this, which promises to explain so much for the theory of the earth: do not say anything on the subject. I hope in two or three days to be able to give you the whole details, of which you will immediately perceive the importance. Faraday has discovered a combination of chlorine and charcoal.

“Sir E. Home has made out the use of the pigmentum nigrum. I write from the table where I am *magnetising*. I rejoice your book is so far advanced.

“If I can conclude my labours by the 24th, I will come down before the session of the R. S.

\* \* \* \* \*

“I am, my dear John,

“Very sincerely,

“Your affectionate Friend and Brother,

“H. DAVY.”

The knowledge of the experiments of M. Ørsted, alluded to in the preceding letter, he obtained, I believe, at second-hand by a letter from a friend at Geneva. I mention this to explain his applying the epithet vague to them, which he would not have used, had he then been acquainted with the original notice by which the discovery of the Danish philosopher was communicated to the scientific world. This discovery, in its consequences hardly inferior to the great discoveries in electricity which have immortalized the names of Franklin and Volta, was very simple in its nature; viz. that when the extremities of a voltaic pile or battery are united by a perfect conductor, as a metallic wire, and the compass is brought near it, the needle is attracted by the wire, and may be made to deviate from its natural direction.



This leading fact my brother immediately verified; and, reasoning upon it, he inferred that the uniting wire itself, during the passage of the electricity through it, must have become magnetic, which was confirmed by experiment. He found that it attracted powerfully iron filings, like a magnet; and further, that if the battery was divided, and the separate parts were joined by wires, each wire had the same power; whence the expression in his letter, that the battery is a powerful magnet. He did not stop here: guided by the same process of analogical reasoning, he formed permanent magnets by means of voltaic electricity; and finding that the magnetising power of the voltaic battery, like its heating power, is proportional to the quantity of electricity transmitted, it occurred to him that it would also be exhibited by common electricity, when accumulated in the Leyden battery, which, on trial, proved to be the case. Lastly, speculating on the facts which he had ascertained, he conjectured that the magnetism of the earth may be owing to electricity; and the variations of the needle to the alterations in the electrical currents of the earth, in consequence of its motions, internal chemical changes, or its relations to solar heat; and that the auroras at the poles may depend on the same cause.

These facts and speculations he brought forward in his first communication on the subject to the Royal Society, dated November 12, with a suggestion of practical application for making powerful magnets, by attaching bars of steel transversely to lightning conductors.\*

His speculations he merely offered as conjectures, though, I believe, he was tolerably convinced they were

\* Phil. Trans. for 1821.

true; as has since been almost demonstrated in regard to the most important of them. This conviction he expresses in a letter to me, written the day after his paper was read: he says, "I think I have nearly a direct proof that the magnetism of the earth depends on electricity." And in his paper he observes, "This is evident, that if strong electrical currents be supposed to follow the apparent course of the sun, the magnetism of the earth ought to be such as it is found to be." Relative to the nature of magnetism he did not venture to give an opinion, excepting so far as to express doubt of magnetism and electricity being identical, founded on remarkable difference of qualities exhibited by them; such as the magnetic influence of the voltaic and of the Leyden battery passing equally through conductors and non-conductors of electricity, and of producing its effects at a considerable distance with the same readiness through air and water, glass, mica, or metals. He attempted to produce chemical effects by magnetism; but, as he states, without success. I mention this to show the extended and rapid view he took of the subject, and with what facility he applied himself to the interrogation of nature.

## CHAPTER V.

Death of Sir Joseph Banks in 1820, whom he succeeds as President of the Royal Society—Particulars of him in connection with this office—Observations on it—Notices of his continued scientific labours ; especially on magnetism and the liquefaction of the gases—Verses on Lord Byron—Researches on the corrosion and on the protection of the copper sheathing of vessels—Journal of an excursion in Norway and Sweden in 1824—His declining health in 1825—Specimens of his poetry at that time—His last election as president of the Royal Society.

ON the 19th June, Sir Joseph Banks, who had been for so many years President of the Royal Society, died.\*

My brother immediately came forward as a candidate for the office thus rendered vacant ; the highest in honour to which a man of science can aspire in England. The dignity, no doubt, was attractive to him. It was surely an honourable ambition to occupy a place which had been filled by Newton. But this, I believe, was not his principal motive. He conceived that his powers of usefulness would be increased ; that he should be able to give an impulse to science, and forward its advancement by example and exhortation ; and he flattered himself that he might be able to prevail with the members of his Majesty's Government to afford to science some substantial support, worthy of the cause

\* He was first elected in 1778, and re-elected annually till his death, comprising a period of 42 years.



and worthy of the country, which to the resources of science had hitherto owed so much and contributed so little.

Other candidates were spoken of at the same time, and for two of them their friends canvassed to some extent. The competition, however, was of short duration. On the 30th of November, the day of election of the officers of the society, there was a very full attendance of the Fellows, on the rare occasion of voting with open lists; the result of the ballot was almost unanimous in favour of my brother, and he was accordingly pronounced duly elected by Dr. Wollaston, who was then acting President; and for seven years afterwards he was successively re-elected without the least opposition.

I was with him the whole of the day of his first election, and can record with pleasure how tranquilly he passed it: in the morning he had no apprehension of failing of success, and in the afternoon he showed no undue exultation in having obtained it. Before going to the public dinner of the society, held on the anniversary of the election of its officers, he prepared an address, and the speeches it would be required of him to make, as was always his custom when he had to speak in public; for he held that preparation was necessary to speak well. The dinner was very fully attended; and the manner in which his speeches were received, for so grave a body, was quite enthusiastic. On the first regular meeting of the Society after St. Andrew's Day, on his taking the chair, he delivered an address, "On the Progress and Objects of Science," in which was well displayed his peculiar style of poetical illustration, his comprehensiveness of mind, and power of discrimination. Without lowering other societies,

he upheld the Royal Society as the elder brother, and its Transactions as the most proper place for the publication and preserving of important discoveries in all the branches of natural knowledge. He wished that as they had been hitherto, so they should continue to be the record of British science. The concluding part of this address was very characteristic of the tone of his mind, and of the views and hopes he delighted to indulge in.

This discourse was published in 1827, with five others, which were successively delivered at the opening of the winter session of the Society, when the award of its medals is decided by the President and Council, and these are presented to the individuals distinguished from the Chair. In delivering a discourse on these occasions, he merely persisted in doing what his predecessors in office had before done ; but he was, I believe, the first President of the Society who noticed publicly the Fellows deceased during the year, and briefly described their character and merits as men of science. This he did not only to indulge his own kind feelings, and, as far as possible, contribute to the rendering of just honours to deceased worth, but also for the purpose of keeping alive the spirit of philosophical inquiry, and the love of scientific glory, “and of kindling and perpetuating that flame of science which in the Royal Society ought to be undying.” How he executed this task may be seen in the published Discourses, which were printed as they were delivered. They constitute good specimens of his style of oratory, and remind me forcibly of his lectures in the theatre of the Royal Institution ; but the mere reader of them will form but an imperfect idea of their effect when delivered on an occasion appropriate, in the tone of voice and animation

which the occasion called forth, addressed to individuals honoured by the highest marks of respect the Society can show, and to an audience capable of appreciating the justness of every remark; and in the instance of the eulogies spoken on lately deceased Fellows, sure of awakening kindred sympathies, and the kind and tender recollections of a large part of his audience. Whether they had any effect beyond that of pleasing and moving the minds of those to whom they were addressed, it is not easy to say; but in their published state, I would hope that they may be permanently useful in the way he intended, and tend to preserve the dignity of science, and call generous minds to those excellent and exalted pursuits which, like every thing good, are their own reward,—delight in action, pleasure in contemplation and recollection, and in application are of the highest utility.

The meetings of the Society this year were unusually well attended. Some of the Fellows who had withdrawn during the time of Sir Joseph Banks, owing to the angry contentions which took place in the early period of his presiding, now resumed their attendance; and general harmony and apparent satisfaction prevailed amongst a body of men, so numerous, and of such different tastes and pursuits in literature and science, that it is too much to expect they will consider their interests the same, or even the interests of science, and be for any length of time contented with any President. As it had been the custom of former Presidents to observe a certain state in all that related to their office, conceiving, no doubt, that it helped to maintain its dignity and respectability, my brother did not depart from their example, and he continued to take the chair in a full court dress; to have the splendid mace



of office placed on the table before him,\* and to sit covered.

His predecessor had for many years an evening party at his own house, for the purpose of assembling men of science, and affording them an opportunity of meeting each other at a fixed time and place. My brother continued this practice, changing only the evening of the meeting from Sunday to Saturday; the former appearing objectionable to some individuals, and he preferring one to which no objection could be made, especially of the serious kind, of interfering with a day which should be set aside for devotional purposes. These evening parties were very similar to those of Sir Joseph Banks; and as long as I was in England, they were numerously attended, and were very agreeable, amusing, and useful. They brought together, not merely men of science, but also literary men, poets, artists, country gentlemen, and they were very attractive to foreigners. The subjects of interest of the day were there discussed, and curious information obtained from the best sources, and knowledge exchanged between individuals, as in a great mart of traffic, each giving and receiving according to his acquirements and wants. There the physiologist and naturalist might collect curious particulars from an African traveller, or Arctic navigator, respecting many objects of his particular inquiries, and give hints for further investigation, or solve questions which might have perplexed the original observers. An evening seldom occurred without some novelty in art, science, or nature, being brought forward—as the bones from the Kirkdale Cave, or a new chemical compound, or a magnetical experiment, or a recently discovered

\* It belonged to the Republican House of Commons,—“the bauble” removed by order of Cromwell.

mineral, or some new instrument or apparatus; and a great zest was given by the presence, as was generally the case, of the inventor or discoverer, who was always willing to offer explanation, and give detailed information to those who were desirous of receiving it. And, moreover, a stimulus was thus imparted—a fresh excitement to the mind to continue and perfect useful investigations; and aids were often given which greatly contributed to the successful termination of scientific labours.

In these parties, the distinctions of society seemed very much to be lost in the distinctions which science and merit confer. Men of the highest rank in the country mingled with men without any claim to notice, excepting that high one of superior knowledge; and it was a noble thing to see how much more attractive it was, and more honoured, than the highest nobility destitute of this qualification. I remember one evening, when the company was reduced to a small number by the lateness of the hour, and those who remained had collected round the fire, one of the party, I believe it was Dr. Young, observed in playful remark, “Ah! I perceive all here are doctors:” and so it proved; there being two or three doctors of physic—one, I believe, of divinity, and three of civil law; and of these last two were baronets, and one was an earl, who, though distinguished for his high bearing on ordinary occasions, on this occasion seemed pleased to be considered of the same grade as the rest.

At this time my brother resided in Lower Grosvenor Street, No. 28; and as long as he remained in that house, he continued to give these weekly evening parties during the session of the Society. Afterwards, when he removed to 26, Park Street, Grosvenor

Square, in 1825, they were discontinued; and, as a substitute, the library of the Royal Society in its apartments, at Somerset House, was opened on Thursday evenings, after the regular meeting was concluded, where the Fellows and visitors could converse familiarly on matters of science. What were my brother's motives for giving up his evening parties I was never accurately informed, being abroad at the time. I conjecture that several circumstances, which it is unnecessary to describe, influenced him on this occasion. I know that when he first became President, he attached some importance to these social meetings, and it was his wish to have made them as agreeable as possible, and as attractive; and to have opened the drawing-room to them, so that ladies might not be excluded; but this he could not effect; and perhaps it might have failed had it been attempted. The parties would, probably, have gained less in gracefulness, ease, and vivacity, than they would have lost in usefulness, zeal, and interest in matters of science. It is to be feared that they would have become fashionable assemblies, rather than scientific meetings. So long as his health permitted, he continued to give the dinners which were expected from him as President, to which were invited, principally, the working Fellows of the Society. The plate which was used on these occasions was very appropriate, consisting chiefly of honorary plate, and principally of the handsome service which was presented to him in 1817, by the great proprietors of collieries in the North of England, for his discovery of the safety lamp.

My brother commenced his Presidential duties with a high sense of their importance, and a sanguine expectation and desire of promoting the interests of the



Royal Society and of science. The following entry into his note book, made about this time, is strongly expressive of the feelings of his mind:—

“It is now eleven years since I have written any thing in this book; I take it up again, February 17, 1821. I have gained much since that period, and I have lost something; yet I am thankful to Infinite Wisdom for blessings and benefits; and I bow with reverence beneath his chastisements, which have been always in mercy. May every year make me better, — more useful, — less selfish, and more devoted to the cause of humanity and science!”

Whilst he was in office, the reputation of the Society was certainly not diminished, but was rather exalted; the desire to belong to it was increased; its Transactions were scarcely at any former time more original or interesting; and at no former period was there more harmony in the general body of the Fellows. And yet, I believe, my brother's expectations were not answered, and he effected very much less than he wished. Government was lukewarm or indifferent in matters of science, and gave him no effectual support; when requiring the aids of science, and of the Fellows of the Royal Society, applying to him without hesitation, and, when their objects were attained, forgetting the services. It was his wish to have seen the Royal Society an efficient establishment for all the great practical purposes of science, similar to the college contemplated by Lord Bacon, and sketched in his *New Atlantis*: having subordinate to it the Royal Observatory at Greenwich, for astronomy; the British Museum, for natural history, in its most extensive acceptation; and a laboratory founded for chemical investigation, amply provided with all means requisite for original inquiry, and extending

the boundaries and the resources of this most important national science. I remember well his speaking to me more than once on the subject. He had even the idea of raising the funds necessary for forming a laboratory by subscription amongst the Fellows themselves, without the aid of government; and he probably would have attempted this and some other plans for the advancement of science, had his health remained firm.

As regarded satisfaction and pleasure to himself in his official situation, I fear he was much disappointed, and particularly latterly, when he was least able to bear annoyances. He had no idea of manœuvring or managing, and never shrank from responsibility. On him fell the odium of all measures which hurt the feelings of individuals, whether in consequence of the rejection of a paper which the author supposed was worthy of a place in the *Philosophical Transactions*, or the black-balling of a candidate, ambitious of becoming a Fellow, and, of course, considering himself deserving of that distinction. As no wound, perhaps, rankles more, and is more vexatious than that of personal vanity, so no class of people are more harassing and annoying than those thus offended; and it is from these that a President of the Royal Society is most exposed to attacks,—persons commonly without any dignity of character, and generally without real ability, feeble, and consequently irritable. The man of real ability, or of true dignity is above the Royal Society, and need not condescend to resent any act of injustice towards him, supposing the decision of the President and Council to be unjust. He has the world for his tribunal; and it is only necessary for him to publish the results of his inquiries, and he is sure to have justice done to him.

Another source of annoyance, belonging to the office of President, is that of the perpetual interruption of his leisure from applications by letter and personally, without end, respecting trifling inventions, supposed by their authors to be important discoveries, respecting patents and certificates for patents, and about imaginary discoveries and schemes worthy of Bedlam, and generally proposed by men of unsound, and often insane mind. To be thus deprived of time, and to have attention and patience wearied, must have been disagreeable to any man, excepting of a trifling character, and to my brother it was particularly wearying, and it even interfered with his own pursuits, and deprived him very much of the leisure which he might have devoted to original research. As an honorary situation, without profit or emolument of any kind, but occasioning considerable expense to the individual, a stranger to the nature of its duties would suppose the office of President of the Royal Society, for a man of science, not only the most elevated, but the most agreeable possible. It undoubtedly should be so; but it never can be so, as long as pretension to knowledge, vanity, and presumption, are more common (and they will always be more intrusive) than real knowledge, modesty, and diffidence. The pleasures of office, and especially of honorary office, are generally in anticipation and imaginary—the trials and troubles, real and incessant. These are the rocks and glaciers, the storms and torrents of the Alpine heights; the other, the rosy hues of reflected light, lost on near approach,—to be seen only in the distance, at which all asperities are invisible.

This winter, and the following spring, much of his time was necessarily occupied in his new duties of President. He still continued, however, to work in the



laboratory; and at the last meeting of the Society in July, which closed the session, another paper of his was read, entitled, "Farther Researches on the Magnetic Phenomena produced by Electricity, with some New Experiments on the Properties of Electrified Bodies in their Relations to Conducting Powers and Temperature."\*

Immediately after the closing of the Royal Society, he left town to make a fishing excursion in Ireland, and revisit some of his favourite haunts in that country, which he told me he never entered without feeling his spirits rise, partly, no doubt, from the kindness of heart which he always experienced there, and partly from the original and diverting manner of the people.

I had the pleasure of accompanying him sufficiently far to see his remark verified. We set out the day before the coronation of George the Fourth, and spent the day of that splendid ceremony, which all the world was crowding to see, on the quiet and beautiful banks of Cotton's "beloved Dove." From thence we travelled without stop to Port Patrick, and crossed to Donaghadee, with the hope (which was not realised, in consequence of the heat and dryness of the weather) of having some good salmon fishing in the Bush and the Bahn, two of the best salmon rivers in the north of Ireland. At Coleraine we parted: he to pursue his tour in Ireland and the west of Scotland; and I to return to England, after having had the gratification of seeing, in company with him, that marvel of nature and problem in geology, the Giant's Causeway, which in his "Salmonia" he holds out as a recompense for anglers whom, like ourselves, the Bush may disappoint. "Should sport fail," he observes, "the celebrated Giant's Cause-

\* Phil. Trans. 1821.

way is within a mile of its mouth, and furnishes to the lovers of natural beauty or of geological research almost inexhaustible sources of interest."

On his return to town in the latter part of autumn, his most favourite time for scientific investigation, after the refreshment of air and exercise, and the agreeable relaxation of a country life, he entered upon an inquiry, which he hoped might aid in the development of the nature of the imponderable substances or energies of matter. The results he gave to the Royal Society in a paper which was read on the 29th of December, entitled "On the Electrical Phenomena exhibited in Vacuo."

This winter he paid a visit to his family at Penzance, and spent about a week or ten days with them: though not intended to be so, it was a farewell visit, and the last time he saw his mother and his native place. The satisfaction he had on the occasion was more than usual; for, in addition to the natural pleasure of meeting old friends, and his nearest relations, he experienced from his townsmen an attention which was very gratifying to him;—he was honoured by them with a public dinner. The following particulars are extracted from an account of this dinner which was published at the time in a Cornish paper:—

"About fifty gentlemen sat down to an excellent dinner, and spent the evening with that cordiality, harmony, and exaltation of feeling, which all the circumstances of the scene were so well calculated to inspire. It was, indeed, a season of luxurious enjoyment, in the best sense of the words, and one not likely to be soon forgotten by any one of those who partook of its delights. On the one hand, every heart, tongue, and eye were as one to do honour to him who had not only

rendered the name of their *town* famous and imperishable as science itself, but who had added lustre to the intellectual character of their *country*, and had won the still higher guerdon due to the happy few who can claim to be permanent benefactors of the human race. On the other hand, was the proud though unintentional triumph of genius, returning to its native home, adorned with the highest and most conspicuous honours which science and power can bestow, softened and subdued by the spontaneous, simple, and unanimous homage wherewith it was greeted; amid scenes which, fraught, as they were, with all the delightful and indelible associations of boyhood, were of themselves sufficient to give a warmth and tenderness to many things which, elsewhere, and in other circumstances, might have been overlooked as common."

During the next year, 1822, he was less occupied than usual in scientific research, and he communicated one paper only to the Royal Society. It was entitled, "On the State of Water and Aëriform Matter in Cavities found in certain crystals."\*

It occurred to him that the state of the fluid and elastic fluid contents of these cavities might aid the solution of some of the most interesting problems in geological science relating to the formation of the crystalline rocks, in which they are found; and the results which he obtained in examining them confirmed his conjecture. In the majority of instances he found the air in the cavities very much rarefied, and resembling azote in its properties, and the fluid water nearly pure,†—results, theoretically considered, decidedly in favour of the

\* Phil. Trans. 1822.

† In a lecture on geology, the fifth of the course which he gave in 1811, where, speaking of the texture of rocks, and the degrees in which



Huttonian views of the formation of crystalline rocks,—the rarefied state of air and vapour included in the crystals indicating the operation of a high temperature at the moment of consolidation, as if from igneous fusion.

During the summer he again went into Scotland; and by the way visited, I believe, the Kirkdale Cave in Yorkshire, to see those organic remains which had been discovered a short time before, buried in clay, and sealed up by stalactite, bearing evidence to a diluvial catastrophe on the surface, hardly less demonstrative than the results of his researches just mentioned did to the operation of fire in the depths of the earth, in the production of its crystalline rocks.

The following letter I received from him, from a distant part of the Highlands, where he had gone for the sake of fishing and shooting, and the pleasure of exploring wild scenery:—

“ Garve, Inverness, August 11, 1822.

“ MY DEAR JOHN,

“ I heard from Lady Davy that you had been in

they are permeable to moisture, is the following passage, indicating an atmospheric source for the water contained in the cavities of some rocks:—

“ The water found in the cavities of the interior of many stones, particularly of Basalt, seems to be owing to their permeability to the moisture of the atmosphere. I have seen a loose column of Basalt near Portrush, in the north of Ireland, which, when broken, affords considerable portions of water, which has all the characters of rain water; and that its texture is permeable to vapour, I proved by a very simple experiment. A small column was broken into two parts—one immediately examined, afforded cavities almost all of which were filled with water;—the other was kept under a fire-place for two or three days, where the temperature must have been often that of the boiling point of water. There was no explosion, no mechanical disintegration of the stone; but when it was broken, no water was found, it all had escaped through the pores, in consequence of the evaporating agency of heat.”

town, and that your voyage was put off *sine die*. I hope now that it will not take place till the winter is over, and that we shall meet again in the autumn. I shall certainly be in town about the middle or before the end of October.

“ I have had a rough but agreeable journey and voyage amongst the wildest parts of the Highlands—the west of Ross-shire. I have seen some beautiful lake scenery on Loch Maree, and caught some salmon, in spite of bad weather, in the river which runs from it into the sea, and which formerly was the best river for angling in Scotland; but they have now placed the cruives close to the sea, and left only a single pool for the honest angler.

“ I shall take the campaign against the grouse here to-morrow, on Sir George Mackenzie’s moors.

“ The Highland lairds are all marching, bag and bagpipe (not baggage), to Edinburgh, with as strong external expressions of loyalty as if they had never been Jacobites, and Scotland is all in commotion. I dined with Sir W. Scott the day before I left Edinburgh, who is, in fact, master of the royal revels; and I was very much amused to see the deep interest he took in the tailors, plumassiers, and show dressmakers, who are preparing this grand display of Scotch costume.

“ Pray address me, Post-Office, Blair Athol; and believe me to be,

My dear John,

“ Your very affectionate Brother and Friend,

“ H. DAVY.”

It was, probably, during this excursion that he witnessed an interesting incident, which he has introduced in “*Salmonia*,” in describing this part of the Highlands,

namely, two eagles teaching their young to fly. He first recorded the circumstance in verse, as he was much in the habit of doing when an event impressed him associated with any peculiar train of thought. I shall transcribe the lines for the sake of the thought and its aspiration :—

“ THE EAGLES.

“ The mighty birds still upward rose,  
In slow but constant and most steady flight,  
The young ones following ; and they would pause,  
As if to teach them how to bear the light,  
And keep the solar glory full in sight.  
So went they on till, from excess of pain,  
I could no longer bear the scorching rays ;  
And when I looked again they were not seen,  
Lost in the brightness of the solar blaze.  
Their memory left a type, and a desire :  
So should I wish towards the light to rise,  
Instructing younger spirits to aspire  
Where I could never reach amidst the skies,  
And joy below to see them lifted higher,  
Seeking the light of purest glory's prize.  
So would I look on splendour's brightest day  
With an undazzled eye, and steadily  
Soar upwards full in the immortal ray,  
Through the blue depths of the unbounded sky,  
Pourtraying wisdom's boundless purity.  
Before me still a lingering ray appears,  
But broken and prismatic, seen thro' tears,  
The light of joy and immortality.”

During the Christmas holidays he went into Wales, and visited Mr. Vivian, with whom he gave part of his time to investigate the nature of the effluvia arising from the great copper works in the neighbourhood of Swansea in the operation of reducing the ores of copper, and to the most effectual means of correcting their noxious qualities.



This winter he made no communication to the Royal Society; but early in the spring of 1823 he gave a paper, which was read on the 6th of March, "On a New Phenomenon of Electro-Magnetism,"\* in concluding which he performed an act of justice to Dr. Wollaston, pointing out how the discovery of electro-magnetic rotation, realized by the ingenuity of Mr. Faraday, had been anticipated and even attempted by Dr. Wollaston in the laboratory of the Royal Institution. I shall quote his words:—"I cannot with propriety conclude, without mentioning a circumstance in the history of the progress of electro-magnetism, which though well known to many fellows of this Society, has, I believe, never been made public, namely, that we owe to the sagacity of Dr. Wollaston, the first idea of the possibility of the rotations of the electro-magnetic wire round its axis, by the approach of a magnet; and I witnessed early in 1821, an unsuccessful experiment which he made to produce the effect in the laboratory of the Royal Institution."

The week after this paper was read, he communicated a paper by Mr. Faraday, "On Fluid Chlorine;" that is, the gas condensed into the liquid state.

The history of this interesting discovery is briefly as follows:—According to Mr. Faraday, when he was engaged in examining the hydrate of chlorine, my brother suggested to him the experiment of exposing this substance to heat in a closed glass tube, with the expectation, stated in a note appended by him to Mr. Faraday's paper, "that one of three things would happen: that it would become fluid as a hydrate; or that a decomposition of water would occur, and euchlorine

\* Phil. Trans. 1823, part 2nd.

and muriatic acid be formed; or that the chlorine would separate in a condensed state.”\*

Mr. Faraday complied with the suggestion, and the result was a decomposition of the hydrate of chlorine, and a condensation of two fluids: one an aqueous solution of chlorine; the other chlorine uncombined, which had the appearance of an oil, and which, when the tube was broken, suddenly returned to the state of gas.

This fact, the merit of establishing which is due to Mr. Faraday, as much so as that of establishing the rotary motion already alluded to, immediately gave rise to an extension of the inquiry, in working out which my brother was guided by his usual analogical mode of reasoning.

He next tried to render muriatic gas liquid, and he effected it in a very simple way,—“by sealing muriate of ammonia and sulphuric acid in a strong glass tube, and causing them to act on each other,”—one portion of the gas generated, compressing and condensing the other.

To this condensing agency of gas, generated in close vessels, aided by heat at one end, as at the other it might be by cold, there appeared to be no limit, excepting the strength of apparatus. He was naturally, therefore, sanguine in expectation of similar success with other gases by employing the same means.

Mr. Faraday, at his request, continued the experiments, and actually did succeed in obtaining in the liquid state sulphurous acid, sulphuretted hydrogen, carbonic acid, euchlorine, nitrous oxide, cyanogen, and ammonia; but failed in condensing hydrogen, oxygen,

\* Phil. Trans. 1823, part 2nd.

fluo-boracic, silicated fluoric, and phosphuretted hydrogen gases.\*

These results were communicated to the Royal Society on the 10th of April; and at the following meeting a paper of my brother's was read, "On the Application of Liquids formed by the Condensation of Gases as Mechanical Agents."

In July, after the termination of the meetings of the Royal Society, my brother made an excursion into Ireland and Scotland, with his distinguished friend, Dr. Wollaston, who was hardly less fond of angling, though he had acquired a taste for the diversion late in life, as is mentioned in a note to Salmonia. A letter to Mr. Edmund Davy, dated Glasgow, September 1, in answer to some inquiries relative to a plan for preventing the forgery of notes, briefly mentions their course of travel, and the part Mr. Faraday performed in the inquiry on the condensation of the gases:—

"Glasgow, Sept. 1, 1823.

"DEAR SIR,

"I have been waiting ever since I received your letter, which reached me when I was at Ballina, in the county of Mayo, in hopes of being able to inclose an answer to it, under the cover of a Member of Parliament; but having been since principally in the wildest parts of the north of Ireland, I have had no opportunity, and I therefore put you to the expense of postage.

"Mr. Perriere's plan does not appear to me likely to be successful. Dr. Wollaston, who was travelling with me, was of the same opinion. I conceive it could be very easily imitated, so as to deceive the eye of a com-

\* Phil. Trans. 1823, part 2nd.



mon observer, as it has not even the delicacy of workmanship which characterises some other inventions, in which the stamp is of the same complicated kind. What the ingenuity of men can invent the ingenuity of men can imitate.

“I have been visiting some of the wildest spots in Mayo and Donegal, and have again and again been studying the mysterious basaltic arrangements of Antrim; but I almost despair of any adequate theory to account for the phenomena.

“I congratulate you on the increase of your family, and I trust your marriage has added to your happiness.

“The experiments on the condensation of the gases were made under my direction; and I had anticipated, theoretically, all the results. My object, which I hope will be attained, was a new moving power.

“I shall be very glad, at any time, to receive any experiments of yours (which will add to your reputation) for the Royal Society.

“I hear with much satisfaction that your lectures, both at Bristol and Cork, were very popular, and very well received.

“I am, dear Sir,

“Very sincerely yours,

“H. DAVY.”

On his return to town I received from him the following letter, in which the first indications appeared of that malady from which he afterwards suffered so much, and which ultimately proved fatal; offering a remarkable instance of the insidious manner in which some complaints are formed:—

“October 30, 1823.

“MY DEAR JOHN,

“I received your letter from Edinburgh, and I am very glad you arrived safe, and had a pleasant passage. I envy you the power of bearing a sea voyage; I suffer not only at the time, but some days after, which, I believe, is owing to an irritable or diseased state of my liver, or some of the organs connected with it.

“I have not been well since my return to town: I have my usual autumnal affection of the stomach and bowels. I have had pains, apparently not inflammatory, in my hands and feet: can this be gout, or is it merely symptomatic of the state of the stomach?

\* \* \* \* \*

“Dr. Wollaston is nearly well of his wound, which has given him a good deal of pain. The explosion was from a *common* powder-horn; but he cannot explain at all how.

\* \* \* \* \*

“I am, my dear John,

“Very affectionately yours,

“H. DAVY.”

Belonging to this precise period, little occurs in his note-books to extract in verse, and still less in prose. Some lines which he wrote this year on Lord Byron may be acceptable to the reader, especially in connection with some others which he composed the following year; the one on this great genius living, the other dead — portraying his impression of his character and powers, feelings and aspirations, written from more than common knowledge of the poet and the man; with a

perception equally of his great blemishes and irregularities, and of his extraordinary excellencies.

“LORD BYRON.

“WRITTEN WHILST LIVING.

1823.

“Altho’ thy youthful and luxuriant wreath,  
Of splendid and most glorious hues, was woven  
From all the fairest, sweetest flowers of spring,  
Yet some strange blossoms and some poisonous weeds  
Were mingled with the jasmine and the rose,  
And the sweet orange flower; and thy dark locks  
In curling ringlets seem’d a Sybarite’s,  
Well fitted for the odours strong and strange,  
And for the colours varying, where the bay  
Was mingled with the dark anemone;  
And where the birch and deadly night-shade mix’d  
Their leaves incongruous with the lily pale,  
And humble violet, that tranquil hangs  
Its dewy head in shade. But not in vain  
Has time upon thy godlike countenance  
Diffused its chasten’d and more tranquil tints;  
And not in vain has given thy raven locks  
Some hues of wisdom in their silver light,  
Such as full well may suit and harmonize  
Not with the fragrant unguents of the south,  
Nor the rich roses, or the leafy myrtle,  
Which pleasure’s sons upon their brows assume,  
But rather with the darker laurel crown,  
In which some purple amaranths are twined,  
The flowers and leaves of immortality,  
Which may prepare thee for immortal palms  
And Christian songs of triumph!”

---

“ON THE DEATH OF LORD BYRON.

“COMPOSED AT WESTHILL IN THE GREAT STORM, 1824.\*

“Gone is the bard, who, like a powerful spirit,  
A beautiful and fallen child of light,

---

\* It was during a storm that he expired. Mr. Gordon, in his admirable History of the Greek Revolution, records it. “At six o’clock in the afternoon of Easter Monday (April 19), at the instant of an awful thunder storm, Byron expired.”



Of fiery seraph the aspiring peer,  
Seemed fitted by his nature to inherit  
A wilder state than in the genial strife  
Of mighty elements is given our sphere,  
Fix'd in a stated round its course to run,  
A chained slave, around the master sun!

“Of some great comet he might well have been  
The habitant, that thro' the mighty space  
Of kindling ether rolls; now visiting  
Our glorious sun, by wondering myriads seen  
Of planetary beings; then in race  
Vying with light in swiftmess, like a king  
Of void and chaos, rising up on high  
Above the stars in awful majesty.

“Now passing near those high and bless'd abodes,  
Where beings of a nobler nature move  
In fields of purest light, where brightest rays  
Of glory shine—in power allied to gods,  
Whose minds in hope and in fruition prove  
That unconsuming and ethereal blaze  
Flowing from, returning to, Eternal Love.

“And such may be his fate! And if to bring  
His memory back, an earthly type were given,  
And I possess'd the artist's powerful hand,  
A genius with an eagle's powerful wing  
Should press the earth recumbent, looking on heaven  
With wistful eye; a broken lamp should stand  
Beside him, on the ground its naphtha flowing  
In the bright flame, o'er earthly ashes glowing.”

The following copy of verses was written in the beginning of this year, when he was on a visit to a noble family, on whom praise might be lavished, free from adulation, and whose kind attentions were almost the last he received, and warmly felt, towards the close of his career:—

## "ASHBURNHAM PLACE.

January 22, 1823.

- " Is this a time for minstrelsy,  
When nature rests in death-like sleep,  
And roots, and buds, and herbage lie  
Embalm'd in icy cerements deep?
- " When scarce a stream is heard to flow,  
And scarce the distant woods appear,  
So widely spreads the drifted snow,  
The mantle of the new-born year?
- " When the wild songsters of the grove  
Shivering around the mansion fly,  
Without a single note of love,—  
Is this a time for minstrelsy?
- " It is a time for minstrelsy!  
For still the laurel blooms around,  
And bay; and Fancy's dreaming eye  
Can see through mists the fairy ground.
- " And hill, and dale, and woodlands green,  
And lakes, which pastoral meads surround,  
The distant ocean, and a scene  
At home where blossoms rise around.
- " And nature gains from art new powers,  
Charms that in happy union meet,  
Where wild and cultivated flowers  
Together blend their odours sweet.
- " It is a time for minstrelsy!  
For round these walls what magic forms  
Appear in grace and harmony!  
The pencil of the artist warms
- " The coldest scenes, and powers sublime,  
Awakening moral forms of things,  
And new creations, steal from Time  
His scythe, and close his wings.

“ It is an hour for minstrelsy !  
For social converse wakes the mind  
To pure and happy sympathy ;  
And elegance and taste refined

“ Call to the hospitable board  
The force of reason and the flow  
Of memory, with wisdom stored,  
Which might awake a grateful glow

“ In Fancy e’en, tho’ check’d by age ;  
Make sunshine in the darkest day,  
And kindle in the coldest sage  
Some strain of vocal minstrelsy.”

We are now approaching the last term of my brother’s scientific labours, in which he was occupied, with little interruption, from the latter end of 1823 till the summer of 1826. During the short period of about two years and a half, he communicated to the Royal Society the four following papers :—

“ On the Corrosion of Copper Sheeting by Sea Water, and on the Methods of preventing this Effect ; and on their Application to Ships of War and other Ships.”

“ Additional Experiments and Observations on the Application of Electrical Combinations to the Preservation of Copper Sheathing of Ships, and to other Purposes.”

“ Further Researches on the Preservation of Metals by Electro-Chemical Means.”

The Bakerian Lecture for 1826—“ On the Relation of Electrical and Chemical Changes.”

These papers, like those on fire-damp, offer a happy instance of an inquiry instituted in quest of a remedy for a practical evil, after having accomplished the specific object for which it was commenced, leading to other



collateral researches, extending the boundaries of physical science, and, applied to the arts, conferring additional and unexpected benefits.

My brother's attention was called to the corrosion of copper sheeting in sea-water by the Commissioners of the Navy, to whom, on account of the vast loss in consequence of it resulting to the country, it had become a matter of serious consideration.

Without loss of time he entered on the experimental investigation of the problem.

He first ascertained that there is no constant relation between the impurity of copper and the facility of being acted on or corroded by sea-water, which was at that time, and is indeed still, a popular notion; the contrary rather appeared to be the case: in some instances the purest specimens suffered more than those containing alloy.

He next examined into the minute circumstances of the action of sea-water on copper. He ascertained that the corrosion of the metal is owing to the joint action of air in the water, and of its saline ingredients; oxide of copper being first formed, and that becoming an insoluble submuriate, and magnesia being at the same time precipitated.

Reasoning on these changes, and the elements concerned in them, in quest of remedial means, he had recourse to electro-chemical science, and the principles which he himself had established of the apparent identity of electrical and chemical attraction, and the power of controlling the one by the other.

His discovery, the result of these researches, he thus announced to me, in a letter written just after his first paper was read, and when not even a shadow of doubt appears to have crossed his mind of any possible failure

in its application to the grand object of naval economy, for which the inquiry was instituted, and when he indulged, in consequence, in most sanguine expectation of perfect success:—

“ Firle, January 30, 1824.

“ MY DEAR JOHN,

\* \* \* \* \*

“ I have lately made a discovery, of which you will, for many reasons, be glad. I have found a complete method of preserving the copper sheeting of ships, which now readily corrodes. It is by rendering it negatively electrical. My results are of the most beautiful and unequivocal kind; a mass of tin renders a surface of copper two hundred or three hundred times its own size sufficiently electrical to have no action on sea water.

“ I was led to this discovery by principle, as you will easily imagine; and the saving to government and the country by it will be immense. I am going to apply it immediately to the navy. I might have made an immense fortune by a patent for this discovery, but I have given it to my country; for in everything connected with interest, I am resolved to live and die at least ‘*sans tâche*.’

\* \* \* \* \*

“ I am, my dear John, very sincerely,

“ Your affectionate Friend and Brother,

“ H. DAVY.”

The principle of protection was perfect; in fact, in his after researches, and the trials which were instituted both in the Navy and in the Merchant’s service, he experienced no disappointment. The only difficulty

experienced indeed, in the practical application of his method, rose out of the perfection of the principle ; for, whilst it defended the copper sheeting, and perfectly preserved its surface from corrosion and scaling off, it allowed, which the scaling off prevented, of the adhesion of sea-weed and shells, rendering the bottom foul. Remedial means he suggested against this evil, compatible with a certain protection, founded on experiments made in the laboratory ; but these, I believe, he never had the opportunity of trying on a large scale. The experiments made in the Navy were the least successful of all. If not carelessly made, they were very soon relinquished. Had they been carried on by persons sincerely interested in them, it is probable that their introduction would have been successful ;—it is probable that some simple means would have been discovered, by which, whilst the copper was fully protected from corrosion, it might be kept clear by a mechanical process, which, in a ship of war, with so many disposable hands, would be of easy application. One instance, and one only, has come to my knowledge, in which an attempt of this kind was made by an officer of more than usual intelligence and activity. It occurred in the “Madagascar” frigate, on the Mediterranean station, when commanded by Sir Edward Lyons, from whom I had this information. She was provided with protectors ; and, in consequence of the preservation of her copper, her sheathing became foul, so as to impede her sailing. In a very short time, I was assured, without entering port, by applying some very simple method of cleaning (I believe called “hogging”), the adhering weeds, &c., were removed, and she immediately recovered her usual speed. Were the same attention given to the bottom of a ship that there is to



the high order of her decks, or only a small portion of that attention, it seems, from this example, highly probable that foulness from adhesion might be entirely prevented, the protectors rendered perfectly efficient, and an immense saving of expense effected.

No sooner was the beautiful principle of metallic protection discovered, than various economical applications of it were obvious, for the purpose of preserving iron, steel, tin, brass, and other useful metals, both in delicate instruments, in powerful machinery, and in great constructions designed for permanency. "Whenever a principle or discovery," he remarks, in concluding his last Bakerian Lecture, "involves or unfolds a law of nature, its applications are almost inexhaustible ; and, however abstracted it may appear, it is sooner or later employed for the common purposes of the arts and the common uses of life." It was this conviction of extensive and increasing usefulness of his discovery, and the persuasion that it would be duly appreciated by posterity, which constituted his reward for his toils in the inquiry, and more than compensated for the apparent ingratitude of his contemporaries, and, after the first irritation had subsided, made him regardless of the too many slanders and false reports which were invented and circulated at the time by ill-designing persons.

In connection with his researches on the protection of copper sheathing, in the summer of 1824, he made a voyage in the North Sea, for the purpose of trying the influence of motion on the protectors. On his return, he wrote the following note, descriptive of his course :—

London, August 22, 1824.

" MY DEAR MOTHER,

" I returned on Tuesday from some extensive travels and voyages of more than two thousand miles, having

gone round the coast of Norway, and through Sweden, Denmark, Holstein, and Hanover. I went sometimes in the Admiralty steam-boat, which was at my disposal, and sometimes by land.

“ I have done a great deal in seven weeks, having made some important philosophical observations, spent some days in the capitals of the north, and passed the North Sea twice ; once in a storm, in which the steam vessel had to go against wind and tide.

“ I have been successful in all my objects, one of which is important to the navy.

“ Whilst I was in the north, John was sailing south. I have a letter from him of the 17th June. He was well, and just going from Malta to Greece. I am not sure whether I shall go to Scotland or to the north of England ; but I shall leave town immediately. Lady Davy is making a tour in Switzerland, and is quite well.

“ With kindest love to my sisters,

“ I am, my dear Mother,

“ Your affectionate Son,

“ H. DAVY.”

He had for a long time discontinued keeping a diary when travelling. Of this excursion, however, he wrote an account, the greater part of which I shall lay before the reader. It thus opens at Gottenburgh, when confined by indisposition to the solitude of his chamber :—

“ Gottenburgh, July 21, 1824.

“ Is the melancholy and the debility produced by sickness favourable to intellectual exertion ? I believe so. The mind necessarily becomes contemplative when the body is no longer active, and the empire of sensation yields to that of imagination. Under such circum-

stances, likewise, the mind is sober, and disposed to discover realities, and values quiet and comfort more than pomp and éclat. During the last fortnight I have seen and felt some novelties; yet but for the wretched state of body in which I am, they probably would never have been committed to paper.

“I left London on the 30th June: Lady M. would say, ‘on the wings of hope, aided by the paddles of steam.’ I had never before seen the whole of the river, or known the immensity of British capital, industry, and activity displayed by the great inlet to the most wonderful city in the world.

“We left Greenwich at two o’clock, and before nine we were coasting the Suffolk low lands, and lost sight of land before it was dark. A favourable wind and steam enabled us to see the coast of Holland next day at three; and before the evening we had passed the Texel, and the sand hills north of the Texel, and were in the apparently unbounded ocean, and saw the sun set in clouds, which looked as the promise of another fair day. In the morning we were called up on deck to see Heligoland appearing,—an abrupt rock capped by a light-house, scarcely distinct, in consequence of the dark sea and sky. The rain poured in torrents; and through the delay of shifting, and the slowness of pilots, we did not land till twelve, when I found the use of my water-proof cloak and boots. There can scarcely be said to be a harbour round this rude island, but of course there is shelter from all winds; and we anchored within a gunshot of the town (one-eighth of a mile). The houses are constructed of wood, and in general low and confined. The population seems miserable; but all the articles of life very cheap, particularly bad wine and spirits, madeira and brandy being sold for a



shilling a bottle, and other spirits and cordials proportionally cheap. The island is about a mile long, and principally covered with potatoes. The rocks which everywhere surround it, except on the south side, are peculiarly crumbling greywacke stone, in a constant state of decomposition. The highest points of the cliff appeared to me to approach 400 or 500 feet. No wheat is grown, but a little barley. The island has ceased to be the deposit of English goods, and is now miserably poor. The language high German; the women fair, but not handsome; very little dark hair; flaxen locks and blue eyes form the character of both men and women; and, as the women labour hard, their forms are neither good nor graceful. Next day, 3d July, we dined with the governor, and by the evening were completely tired of the island. At six we sailed, with rather a rougher gale than was pleasant; the gale increased, and the ship rolled. About two, a thunder-storm came on; and, to the relief both of my mind from anxiety, and my stomach from sickness, the rain stilled the waters. About twelve next day, the weather was agreeable, and the sea tolerably calm. We were on the North Sea. About two the weather changed; a breeze came on, which strengthened into a gale. Towards night the ship rolled considerably; the water dashed over the decks, and the vaunted power of steam over the elements was as nothing: yet the steam carried us on, though slowly; and after much labouring, and some danger, and much dripping, and one death, that of an unfortunate painter, we made the coast of Norway at seven in the morning,—my experiments ruined, and misfortune to aggravate the misery of sickness. I did not get out of bed till we were fairly lodged in port at Rleve; for even the desire of seeing a new country

for some time did not reanimate me to any exertion, so strong had been the tossing of the waves.

“We had gone to bed in sickness, storm, and darkness: in getting upon deck, what a contrast! All was calm, beauty, and repose. We were in the bosom of a basin rather than a bay; the water like a mirror, beautifully green, and myriads of medusæ of the most beautiful colours, like animated flowers, moving about us, some of them nearly eighteen inches in diameter, and having antennæ several feet in length. Above our heads was a bright blue sky, seen through a kind of telescope of high rocks covered with wood, the wood of England oak, birch, alder, and some few pines, and wild roses, and woodbines. The steam-boat was so close to the rocks that we landed on them by a board, and it was a matter of wonder where she could have made her entry; rocks rose every where around us. The rocks were granite, modelled by the rude and primitive hand of nature,—rude and primitive, as far as these elder foundations of our globe are considered.

“We soon landed, and walked over granite rocks to the town of Mandels, which is on the other side of a fine river. The idea of salmon-fishing reanimated us; and I soon hired a boat, and we passed up the river. The town of Mandels is built entirely of wood, and seemed to contain very few respectable houses. The inn was uncomfortable enough. Such beds! hardly big enough. The rooms without plaister or paper, displaying the moss and the *cut trees* (pines) of which the whole was built. Some of the women were tolerably well-looking; both men and women very civil, probably without the means of being hospitable. The scenery about the river very peculiar. Rocks, rising like islands out of the sand, or really islands in the

sea, from 100 to 600 feet high, and covered with wood; and so numerous and so various in their forms, colour, and distribution of masses, as to be very beautiful. The river was of the size of the Tweed before it joins the Tiviot, and had the reputation of affording the best salmon in Norway. We rowed against the stream, the scenery constantly becoming more beautiful. The woods came down to the water's edge. There were some cliffs, but no precipitous ones. The banks were green slopes, with the wood peculiar to England, and most of the flowers, and beautiful meadows close to the water, which was very transparent, with a hue in which amber predominated, but not peaty. The outline was generally formed by rocks, some of which in the distance were covered by pines. I threw the fly in vain for an hour, and then let it trail behind the boat, when two or three unlucky trout were taken, which were like the English small trout. We were resolved to procure a salmon for our dinner, and waited till a net was drawn; when several were caught, one of which must have weighed twenty pounds. I purchased one about nine pounds for two shillings. We continued till we were stopped by a rapid, where the rocks came down close to the river, and where the scenery was more wild, and upon a greater scale. Here we left the boat, and walked about a mile, to the fall of Mandels river, which is rather a rapid than a fall,—a succession of foaming stream and pool, where the water leaps from rock to rock, from four to ten feet, and over which salmon easily make their way. The narrow channel through which the river runs is very picturesque, and the birch trees grow close to the fall, as if out of the granite rock. The sun was bright, yet I thought myself



sure of a salmon ; but my skill was vain. I saw two or three rise, and one, I believe, at my fly ; but neither this day, nor the evening had I any success. Next day, Lord Clifton\* and I went to a salt-water lake or pond, where we caught four sea-trout, very good and red, with artificial flies ; they rise very freely. Here the scenery was exquisitely beautiful ; a succession of arms of the sea all like inland lakes, full of granite islands, and surrounded by high hills covered with the richest kind of vegetation ; the rose, the woodbine, the cornel tree, and all our English flowers, and mountain ash, and birch, and oak, in profusion. Every moment we opened on a new scene as we passed by in our boat. We asked if there was no fresh water near, looking for a stream in which we might fish. They carried us to a spot, where evidently a torrent sometimes passed, and in less than twenty yards we found ourselves on the rocky brink of an inland fresh-water lake, as beautiful as the upper lake of Killarney, and something like it. Here we fished without success ; but we were recompensed by the agreeable nature of the scenery, which was exquisitely beautiful. In addition to the other clothing of the rock, heath, juniper, the blae-berry, were found here in abundance, and the lake was full at the borders of the most beautiful water lilies. In this lake, the boatmen informed me, char was found ; at least from their description it must have been this fish.

“I was told of a fall on a river about six miles to the west. I mounted a Norwegian pony, and went with the son of the innkeeper. This journey the scenery was beautiful throughout the ride. Two fine fresh water lakes came in view, with many wooded islands ; the granite rocks assumed more the character of moun-

\* Late Earl of Darnley.

tain, and fine woods clothed their tops. The road was rugged, and accessible only for horses and the wretched little cars of the country, something like those of Naples, and which, upon these rocky paths, must be painfully jolting. The vallies for five miles were narrow, and the scenery, lake and rock, covered with wood. We passed a mountain torrent, beautifully banked and wooded, where I saw a number of small trout. After we had attained the summit of the second mountain, we saw a deep pastoral valley at the termination of a lake below; and after mounting a second hill more cultivated than any we had passed, came to the river, which rolled through a broad valley bounded by cliffs of granite, with pine-covered hills beyond. The river was full of green weeds; I saw a few trout in it, but no salmon. The scenery was very beautiful all the way to the fall, which was not very fine. A small body of water fell perhaps thirty or forty feet; but all the rocks around the fall were disfigured by saw mills, and the water covered with deals, and hills of saw-dust close to the banks of the river.

“ After spending four days at Mandels we left it in the steam boat for Christiansand. We had a little rough sea in going out of the port; afterwards a delightful voyage between rocks and islands, some bare and some wooded, and through channels sometimes not so wide as our vessel was long, and in perfect calmness. Here we saw the first sea eagle, and many birds which appeared eider ducks, and other water-fowl. We arrived in four hours at Christiansand. Here we met with great hospitality, dining out every day; the first day with the Consul of the Hanseatic Towns; the second, with the British Vice-Consul. Count Reinhard, the Hanseatic Consul, took me to see the Torjedale, which

empties itself into the harbour of Christiansand. The harbour itself is a very fine one, with the peculiar Norwegian features of rocky islands, high granite crags more or less covered with trees, and promontories generally topped with firs. The quantity of firs was greater on this coast than at Mandels, and the valley of the Torjedale displayed more fir wood than wood of any other kind; yet, occasionally birch, alder, and oak appeared on the banks, and birch was not uncommon. The glen leading to the Torjedale was narrower, but the rocks on a grander scale than anything we had yet seen. The river itself, a fine majestic stream, as large as the Rhone, at Lyons, of a fine green colour and perfectly transparent, presenting every where along its banks the unpicturesque riches of Norway,—the white stripped and trimmed floating forests. From a point of rock near Mr. Reinhard's country house, I saw a salmon leap in the river, just below one of those great chains of fir which are placed to arrest the wood floated down from the mountains in the interior. The dinner at Mr. Reinhard's was plentiful, but a mixture of German and English, without the kipper salmon and spirits. Toasts were given and wine drank with moderation,—Bordeaux and excellent hock of 1811, and excellent Madeira; with cherries and strawberries, and green peas. Mr. Mark, the English Vice-Consul, invited us to dinner next day,—to dine and go first to the waterfall, where he promised I should catch a salmon by hook or by crook. We went off at nine o'clock, and took boat at four miles from Christiansand, and by the help of four oars went up the river, the banks of which are of the same character as those I had already seen,—rude rock, hills covered with oak, birch, and alder, cliffs with pines above, and a variety of pool and stream. At half



a mile from the fall, the scenery became wilder, and we were obliged to walk. We went to a country house of the Consul's, and found there excellent refreshments; kipper salmon, cheese, and Hamburgh sausages, with white and red Bourdeaux. We soon came in sight of the fall, a magnificent rush of water, no where perpendicular, yet making a grand display of one of the great *machines* of nature. I should rate the succession of descents (two being principal) at 120 or 130 feet, and there are many rapids below. It is disfigured by saw-mills, and, in my opinion, by the rushing down and constant appearance of the floating wood; yet it was a grand sight; and the fir woods upon the surrounding hills, and the island which divides the river into two parts, and the immense extent of rapid all white upon green, had a very fine effect. No salmon rise above this fall, which, in point of quantity of water, I think surpasses that of the Rhine at Schaffhausen; but is inferior to it in perpendicularity and in picturesque accompaniments. We returned to dinner at Mr. Mark's, where we again found kipper salmon, anchovies, brown bread and butter and various liqueurs. This was the prelude to the dinner. Our first course was ham, and peas boiled with sugar in their shells; then some salmon boiled; then chickens roasted, with abundance of parsley in their bellies; then roast veal; and last of all cranberry jelly, most delicious, with cakes and sweet things. We had plenty of fruit upon the table before dinner, which seemed as the garnish, and both here and at Mr. Reinhard's salad with cheese after dinner; the salad being very good, particularly the cucumbers, which had been prepared by being kept some time in salt, and then washed, which makes them tender, and abstracts their unwholesome juice, which separates in large quantities.

“ *Two culinary hints: Roast your fowls* with plenty of parsley in their bellies; place sliced cucumbers, if you wish them to be wholesome, in salt. *Another: eat kippered salmon raw*, with pepper, and bread and butter. Bourdeaux, Madeira, and port, were the wines all drank with dinner. Their toasts, their healths, and short speeches, all during dinner. After the cakes and the last toast we all went to coffee, and then home, though the hospitable master of the house offered us supper and *bishop*; probably wine and water hot.

“ We left Christiansand in the morning at twelve, and at four found ourselves safely moored in the harbour of Arendal. We passed generally within the rocks, and had the same kind of scenery as in our voyage from Mandels,—an immense variety of little rocky *islands* constantly opening upon us; and sometimes our passage seemed hardly large enough for the passage of the boat. The harbour of Arendal is very beautiful, and the town most singularly placed upon a rock, with rocks surrounding it and deep water close to the houses. Trees crown the rocks, and neat little houses come close to the water’s edge. I went immediately to a beautiful wooded rock just above the town, where the Mandel scenery appeared as if echoed upon the river of Arendal. I likewise went to visit the iron mines, which are curious, in sienite, with all the rare specimens well known to mineralogists. One of the mines presents a very fine excavation, and you look out upon a tranquil little lake, with pastoral and wooded scenery around it. The day after, a row to the fall of the river: not so large as that of the Torjedahl, but with the same features; the banks pastoral, the usual vegetation below, and pines above. Where one branch of the river enters the sea, close to the fresh water, and

in what can be scarcely brackish water, myriads of beautiful medusæ were to be seen; but none in the absolutely fresh water. In the afternoon we went to Mr. Tiddicamp's country seat to a feast,—a dinner where all the neighbourhood was invited; where *cabbage* was the first dish put on the table, after the usual prelude of anchovies, sausages, and spirits. The anchovies excellent. After the cabbage came ham, carved and served, as by a servant maid, by the young lady of the house, a very pretty girl. After the ham cutlets and peas dressed in the shells, then chickens with parsley; then cakes with jelly (gooseberry cake,) with plenty of Bourdeaux and Madeira, and toasts during the whole of dinner. When I gave *Liberty*, FREYHEIT, the whole party rose, and sang a song in full chorus. My health was drank, and the Royal Society, and the British Constitution, and the memory of Lord Byron. After dinner we all shook hands, and then walked to see a most magnificent view; the sea on one side, and wood almost interminable, with lake and mountain on the other, and a thousand little ponds all surrounded with wood. Some mountains, of apparently the elevation of the Grampians, in the back ground, but without snow. We were struck at Arendal by the manner in which the women were treated. The postmaster was rowed to the Vice-Consul's to this grand dinner by a female servant, who was rather good-looking and young, and who dashed through the surge as a Thames boatman would have done, with her great hulking master sitting opposite to her. I was carried across the lake, from the iron mines, by a boat-woman. The ladies *speak* only Norwegian; but I saw pianofortes, which marked at least the love of music. From the time we landed in Norway till now we have had no



night; the twilight in the west is succeeded by twilight in the east, and at midnight I could read the smallest print. The Norwegian rivers that we have hitherto seen are all beautifully clear, and display their mountain origin and their passage through lakes; the tendency of colour is to green, but no peatiness; nor have I yet seen any river with that celestial blue which characterizes the Rhone. I caught in the Torjedahl two trout, and a sea trout about the size of a large herring. In the Arendal river I caught nothing. I am sure the saw-mills and saw-dust must interfere greatly with the fisheries in these magnificent streams.

“*July.*—We left Arendal at two in the morning, and passed through our usual fine scenery, sometimes almost touching the little islands covered with wood; then branching a few miles into the Northern Ocean, and seeing between us and the shore thousands of islands and rocks. We saw no seals, and the sea-birds were not so numerous as I had expected. The male eider duck we saw in flocks of four or five, flying like a black cock; one sea eagle soared above us; gannets, gulls, sea swallows, and the oyster catcher, were not uncommon. At twelve the next day we anchored in the harbour of Laurvig; more open than any harbour we had yet seen. I examined my experiments, the results of which were very satisfactory, and landed, and examined the zirconite rocks. I saw zincon, I believe, in one specimen. The sienite very fine, with immense crystals of hornblende, and the feldspar having in some places the lustre of the feldspar of Labrador. The arm of the bay of Laurvig wooded even to the sea; a small river as large as the North Esk, in which they say salmon come up late in the year; but the usual disfigurement of mills and iron works close to the town.

“ Having no object for staying at Laurvig, we left it for Frederickstadt at two o'clock; and going rather further from the coast, passed along islands of a larger size, and saw mountains of rather a higher character in the Norwegian land. We crossed the ford of Christiana without ever losing sight of land, and at five found ourselves amongst rocky islands topped with pines, in the mouth of Glommen, the largest river in Norway. The masses of granite in these islands are larger, the underwood and flower-bearing wood less, and the whole scenery ruder: the stream, rather whitish, but not muddy, flowed rapidly by the rocks; yet we moved more rapidly against it, and soon anchored before Medensfel. The fall of the Glommen being only six English miles off, we requested the captain to ascend the stream to it; and we had a most brilliant evening, dashing through the rapids of this immense river, which, I think, exceeds in size the Danube at Vienna. The banks were beautiful, but not wild,—corn fields, wooded hills, and some rocky cliffs. We anchored at the termination of the rapid, in a rush of whirlpool close to the shore, and passed the night on board. It was amusing to see the wonder of the people, who came out to see this new phenomenon of the steam-boat going against wind and tide, and who, from their exclamations, probably took us for Lapland wizards. A person, who asked us to take him up the river, invited us to his father's house, close to the fall; and in the morning the elder brother and our friend came down to take us up in two carriages. We were soon at the fall; which is a grand rush of water, not perpendicular, but in its descent does not make less than 100 feet of white water. It is the grandest rush of water I ever saw, and after the descent boils and foams for half a mile. Salmon

never rise above it. Boats have been sometimes carried down, and dashed with their burdens into pieces. From the top of the fall, where the river is perfectly still, beautifully smooth, and a quarter of a mile at least in breadth, it is a grand sight to see this enormous mass suddenly converted into foam and white wave, dashing with an irresistible shock and a voice like thunder over immense masses of granite. Saw-mills are here likewise, but less offensive from the immense magnitude of the river; and fir trees seen at the bottom are like chips and straws in one of our English rivers.

“We left the fall of the Glommen at seven in the morning, and at twelve we were at Struenstadt. The coast was wild; we sailed between rocky islands covered with wood, principally pine, but sometimes oak and birch. There was more of grandeur in the outlines, but not the same variety as in Norway; but the same immense masses of granite and the same myriads of islands. The day was dark and stormy, and harmonised well with the scenery.

“*Sweden.*

“I had seen very little of the Norwegian inns, but the first specimen of a Swedish inn was far worse than anything I had yet experienced. The inn at Stronstadt was dirty, the beds bad, the fare worse; rye bread and bad butter; the only thing tolerable was a cutlet, apparently made of *minced raw meat*. This is a good hint for tenderness, as it does away with one of the great evils of fresh killing. Stronstadt is a small town on granite rocks, with a variety of coast, and its lands of the same character. A lake, containing pike and coast fish, is



emptied by a small river which runs through the town. We got into a boat, and fished for pike with flies. Lord Clifton took a small one. On landing from the lake upon a small promontory, we found abundance of berries in the English state of perfection; cranberries, blaberries, raspberries, an unknown black juicy berry, strawberries, and juniper berries. Lord Clifton collected a large quantity for three black game fowls he had bought for a guinea alive and of last year. Here I bought a miserable carriage; and next day began my journey to Gottenburgh, over heath, and a country like Scotland, with abundance of blaberries growing to an immense size, and very good.

“Nothing could be more dreary than the first twenty miles of this journey; the country like Ireland, or the worst part of Scotland, and generally without wood; a slight cultivation of barley and oats, but for the greater part waste; the post-houses wretched hovels, inhabited by peasants apparently very ill off. We now passed through a large forest of pines, and the country became rather more interesting; but there were no grand pictures. As we approached to Questrin, where I was to dine, the country became richer, and wooded valleys began to break the unity of hills and heath. A peaty river, which is said to contain salmon, flows through Questrin; and here the whole valley is very fine, with noble views of inlets of the sea, with the usual character of fiord, rock and wood. The sea broke in upon the view more or less from Questrin to Undevelle; and all the country may be regarded as picturesque, and has an air of comfort, and, where cultivated, appeared well cultivated. Undevelle is a town close to the sea, the salt water flowing up to the houses, and with a port. I found the inn very bad, at least compared with inns of

England or France, but not unreasonable. I do not know that I ever went a more disagreeable journey than that of this day; not understanding the language, I could never satisfy the peasants, who were rude and coarse; and my Forebode, though it prevented me from waiting for horses, did not secure me civility; and the peasants finding I could not speak Swedish, endeavoured to impose upon me. The weather likewise was stormy, with a bright sun, and a road which was covered with clouds of dust. The travelling is cheap enough; sixteen shillings in the country and twenty in town, each horse, for six English miles. Forty-eight shillings are equal to one-twelfth of the pound sterling; so that each horse costs  $6\frac{3}{4}$ d. the Swedish mile, and three horses 1s. 8d. British for six miles.

“ *Wenersburgh.*

“From Undeville, next day I pursued my road to Wenersburgh, and found the country improve. There was a good deal of pine wood, with crags of granite, and a succession of small wooded hills, with small peaty streams; the outline of the country was generally made up of great forests of pines. At Wenersburgh, the great lake Wener opened upon me with all the characters of the ocean: the banks are low, and the horizon is more than one-half sky. A little below Wenersburgh I caught the first view of the Gotha, a very fine, clear, and greenish river, about the size of the Rhone at Lyons. It pours with great fury beneath a bridge thrown from rock to rock, over which we passed, and makes a fine rapid, or almost a fall; there is another rapid or fall of the same kind just below. The banks are well wooded;

but here, too, there are no very fine distances. A sort of extended ridge of rock capped by pines stretches to the left, and may have been an ancient bank of the river; from its distant appearance, I should conjecture it to be trap: granite is the rock of the country. I passed by some small lakes, over some wild heaths, and at last came upon the white foam of the cataract of Trolhetta, rising like smoke amidst the village. The river above is a fine, wild, and tranquil expanse: at first it is tortured in its fall by saw-mills, but at the second fall they disappear. Here there is nothing but the grand forms of nature; the bold, grand cliffs 200 or 300 feet high, covered with an almost infinite variety of kinds of wood, and capped by gigantic pines. The water is beautifully clear, and the rapids and falls for nearly half a mile present a variety of picturesque effect. Here a deep whirlpool beneath a fall of twenty or thirty feet in height, and where the river is pressed into the narrowest possible channel; there a succession of rapids, and all white foam, and force, and thunder. I fished, and caught nothing but a little trout as long as my hand; though I was told of large trout of six, seven, or eight pounds, inhabitants of the pool below the mill; yet the evening was favourable, and I tried my best flies and my best skill. The inn was very bad; the master and mistress, the governess and children, feasting out and playing cards. It was on a Sunday that I arrived; I could get nothing except what I brought and what my servant collected in the garden, and I was made sick even by this fare. I got up very early on Monday, and examined the opposite side of the fall, and went round to the locks,—a fine work of art, where the navigation is carried on between Gottenburgh and the Wenersee. The locks are deep in the gneiss and granite, altogether



120 feet in depth, and giving many fine falls and effects of water, where they are to be filled from the clear and beautiful stream of the Gotha. The first natural fall, seen from that opposite, is very fine. There is an island covered with wood in the middle, which hides much of the saw-mills. The salmon never rise above the falls, and there are very few of them; I am convinced they can never abound where there are many saw-mills and much saw-dust. I left the wretched inn for Gottenburgh at nine this day. I got on much better; at least I had no attempts at imposition on the part of the peasants. Throughout Norway and Sweden, the only birds I saw by the road-side, except a few birds of prey, were magpies and hooded crows. The magpies were in myriads, and quite tame; so tame that I could have killed four or five together. The Swedes and Norwegians do not shoot them, and animals soon find their places of preservation. There was more beauty in the road this day, particularly by the banks of a small lake, where there was a great extent of wood and rock and some islands; but this lake could only be called *pretty*. We passed through some large fine woods, and opened upon the Gotha, the banks of which down to Gottenburgh are green, with a plain or flat surface of heath intervening between the river and the hills. The hills possess some variety; and the granite crags and trees, and great diversity of hilly outline, are not devoid of picturesque effect.

“ Gottenburgh is principally built of stone, has a few fine houses, and the Gotha and the harbour form important commercial characters. The inn, as usual, wretched. The *cuisine insupportable*. The bread was *cock-roach pudding*. I swallowed one, and found another. The fatigue of travelling, and the misery of this

inn, which was like an oven, the windows having been kept closed, and the bad food at Trolhetta, altogether brought on a violent bilious attack, with fever, which lasted four days. The third day, however, I went to the marshes, and saw Mr. Bloomfield shoot what appeared to me to be a *Finland snipe*. I went out myself the day after, and shot two or three wading birds, but found no double snipes. I shot a young snipe; and they say the double snipe sometimes breeds in this neighbourhood. I strongly doubt this. I found an old snipe, with a young one, the common snipe; and I think it very likely they have been deceived in taking the young common snipe, which is larger and fatter than the old one, for a young double snipe. Yet, the sportsman who spoke to me at Undevälle said he had seen some young double snipes, and he seemed to me to know the habits of these birds well. He likewise described the breeding habits of the woodcock, and stated that they were not uncommon in the summer in the great woods of Sweden. I went out the next day shooting, to endeavour to ascertain more about the Finmark snipe; but found no double snipes, and killed only a duck and a snipe, and could find no Finmark snipes.

“ This day saw the Crown Prince of Sweden, and his Princess. He received me amiably, and talked upon a great many subjects, and generally well; seemed to understand something of chemical science, and had general views upon all the sciences, and enlightened ideas upon education and the policy of kings. He asked me to dine with him. I sat on the left of the Princess, the Governor of the town sitting next her, and a lady of the court next me. She has a beautiful *upper* countenance, and fine blue eyes, but I should

think her constitution feeble; the grand-daughter of the poor Empress Josephine; and very graceful and gracious in her person and manners. She talked to me about her grandmother, and Thorwaldzen. He entered into a long conversation with me after dinner, "*de omnibus rebus et quibusdam aliis*," particularly Lancaster schools, and the atomic system of chemistry, and Prince Christian of Denmark.

"Mr. Nolan is a very hospitable and amiable merchant: lent me a carriage to come on to Helsingburgh, and I hired a man to take charge of me to Copenhagen, and to take back the carriage. My first day was to Falkenburg; the road was very pretty for the first two or three parts, and then became very dreary, like the wildest part of the low country in Aberdeenshire. There was very little pine-wood; and barren heath and barren rocks formed a considerable part of the country, with some barley and rye, and the rye cut, and potatoes here and there, and peat bogs. At Falkenburg, I went immediately to the river, and fished, but raised nothing. Next morning I went out, and soon roused and hooked a salmon, and fished with a good deal of spirit till dinner time. I killed four small salmon; two I hooked and one I killed, having seen them under the bridge; and in the evening I killed two more. Altogether, I hooked nine or ten, and killed six; but the largest was not six pounds, and some of them were, I think, the *salmo eriox*; but they were good sport, and took freely. I think there was a place further up where I should have had better sport, and which I saw only in going away. At La Holme I saw a very fine river, and was half inclined to stop; but the wretchedness of the inn prevented me. I saw a man fishing with a very large number of *lob worms*, with which they catch salmon, but



they seem to know nothing of the fly. My guide at Falkenburg fished, and caught one grilse with a worm. Neither at Falkenburg nor at La Holme are there any saw mills, and hence, probably, the salmon are found in plenty. They have precisely the character of second-rate Scotch rivers, and are not so hardly fished; but I doubt whether the Swedish fishery, even in these rivers, can be reckoned superior to the Scotch. A gentleman had been there three weeks ago, and fished without catching a salmon; and, I believe, I raised most of the salmon that day in the pools that I tried. From the appearance of the river at La Holme, I am almost sure I should have killed salmon there; I saw a small grilse rise. The colour of these waters is peaty, and the fall at La Holme is close to the road. From La Holme to Helsingburgh the country has nearly the same character as that I have already described. There seems nothing ever prepared in the Swedish inns for travellers, not even the delicacy of kippered salmon. At Engelholme I had to wait an hour for horses, and likewise at the stage next La Holme; for there I overtook my Forebode, though he had been sent fifteen hours before I left Falkenburgh. At Helsingburgh I got a tolerable dinner, and a bed in an enormous room, probably the assembly-room. Here I had an interview with Berzelius, whom I found in good plight, rather fatter than when I saw him twelve years ago. The next morning I hired a boat for Copenhagen, and left Elsineur and Hamlet's Garden on my left, and in four hours landed in the capital of Denmark.

"Copenhagen is a pretty city; the palace a fine building, and the houses well built, and the inn tolerable. The voyage from Helsingburgh was always along the green fields of Zealand, which here and there were

crested with low wood, not unlike the banks of the Thames, with many country houses, all of which had an English fashion. We passed by the Three Crowns battery, celebrated for its effect on the fleet of our greatest naval hero, and were, as usual, strictly examined at the custom-house, which seemed to have for its object the extortion of money, rather than any real desire to prevent smuggling. I dined at the table d'hôte. The mistress of the inn was English, and had been probably a housekeeper or lady's-maid, and had the manners which belong to the shabby genteel. The dinner was very good, and the wine excellent. I saw Professor Œrsted, and he showed me his apparatus for *increasing thermo-electro-magnetism*, but I have some doubts as to the multiplication. Found that Prince Christian was in town the day after my arrival, and went to see him. He received me in the kindest manner, without ceremony, and asked me to dine with him the next day. I accepted conditionally, provided the steam-boat did not come, and fulfilled my engagement. I found him very amiable, in an agreeable country seat, living like an English country gentleman. His villa was very like an English country house of the second or third class. The Princess I found very much improved in health and person, and quite blooming. Œrsted was of the party, and some courtiers. The Prince walked with me round his grounds, and after dinner took me to the King's park—a deer park, like an English one; very extensive, with some tolerable trees. I drank tea with the Princess, and then took my leave. The public seemed to consider the Prince's grounds as their own; for there were numbers of persons walking there, to whom he bowed, and had much of that courtesy to perform. He asked me to

dine with him again on Sunday. I obtained leave from Prince Christian to shoot at Saltholme, where it was said double as well as single and jack snipes breed. I went there on Saturday, and found an immense variety of wading birds on this low and flat island; an infinite variety of the *Tringa* kind, red legs, green legs, the turnstone, the anocetta, the sandpiper—*Tringa alpina*—in its summer plumage, and exactly like a snipe. I think I saw one double snipe; but was not sure, as there were no white feathers in the tail. I unluckily did not go to the south side of the island till late, and then my *senza cura* servant, threw me out by not putting powder enough in my horn. The chasseurs here are all positive as to the existence of the double snipe as a bird bred in Zealand. I saw in the collection of Natural History the Norwegian white grouse, of the size of our grouse, and having precisely the same summer plumage. Query, is it not the same bird? Dined again with the Prince on Sunday; a visit of ceremony,—thirty people, and of course rather a bore. Went away as soon as possible. On Tuesday took the Kiel boat, and had a pleasant sail to Kiel through the islands, and a most wretched journey from Kiel to Hamburgh through sands and deserts.

“In going from Altona, August 8th, to a country seat, my companion in the carriage, as if casually, said, ‘That is the grave of Klopstock.’ It was under a lime tree; but I lost sight of it, and asked him to be so good as to point it out to me in returning. We returned at 10 o’clock, in a calm, and beautiful evening. I saw two large stones surrounded by an iron paling; Klopstock’s, and his first wife’s and his second wife’s tomb. On the side beyond the churchyard was an illuminated gate, and we asked why it was so illuminated. At first I



thought it was an honour paid to the grave, and the memory of one of the greatest poets Germany has produced. It turned out to be a kind of Vauxhall, into which we entered, and saw a rabble, not one of whom had perhaps ever heard of Klopstock. Such is glory and greatness!—such the illustrious dead! The poet of the ‘Messiah’ has, however, a name for this generation, and we know his birthplace and where his bones lie.

“This day went in search of the double snipe, and did not find one; but Count Blucher, the Governor of Altona, sent me one, which was in excellent condition, and probably a young one. It had no white feathers in its tail, but some whitish ones, and had the speckled breast which I have always seen in snipes of this kind. The whitish feathers were spotted; whereas in the spring bird I have always seen some pure white feathers. I have now no doubt that the bird I saw at Saltholme was one of this species; and I regret I did not examine more the south part of this island, where they are said to breed.

“Hamburgh is a great commercial city, with plenty of luxury and vice. The banks of the Elbe something like the shores of Zealand; and indeed the description of green fields, and marshy banks, applies to all I have seen in the uncultivated parts of Holstein and the Danish islands. Hanover rises in the back ground as a group of black and wooded hills. I have agreed to go to Bremen with Schumacher, to see Gauss and Olbers, and I hope I may be in England by Sunday or Monday. I do not like, however, to go without a day’s shooting; and I shall try again this day, August 9th.

“I did not describe the villages in Holstein; but at Kiel the women appeared handsome, and upon a large

scale; and the houses of the farmers had a grand display of culinary utensils, and looked in the country as if all roof. I saw water meadows, and rye cut, and some oats and barley. The horses exceedingly fine and large; but I should think with less blood in them than the English horses: this struck me in Denmark. The Danes and Holsteiners appear to be rather *fat headed*, and a feeding and smoking people.

“This day (August 9), I have been out in a flood of rain, and hunted over a great extent of excellent moor, and found fewer snipes than we should find in the same ground in England and Ireland,—much fewer than in Ireland and Scotland. But in that kind of ground so favourable to the double snipe, a long grass, with water covering it, and green, we found two double snipes; but, as it proved, they were very wild. One I saw; it had no white feathers in its tail, like the one I saw in September at Venice. Query, is this bird a distinct species, or is this the summer plumage?

“*August 10.*—I dined with Professor Schumacher, whose amiable qualities have impressed me more the more I have seen him; and after dinner crossed the Elbe to Hamburg. We were only an hour on our passage; and the distant view of Hamburg and Altona, and the green pastures, and wooded banks of the Elbe, are not unpleasing as a view. It was full tide, and the water came very high; so that various wild flowers appeared, with only their extreme branches above.

“The day after we rose at six, and proceeded to Bremen, through a country where heath and wood were the principal features. On a heath near Hamburg, I saw a covey of partridges, which, with two or three snipes on a moor near Rottenberg, were the only game I had seen from the roads in the north. Forests of

great extent, with small hills, heaths of great magnitude, and cultivated but not inclosed land, are the characters of Hanover. The peasants were good-looking, the women handsome; the inns appear better than any in the north; the post-horses are good, but they are slow; and the road, though a work of Napoleon, heavy.

“11th.—Dined at the inn late, and had a very fair supper, and found the inn tolerable. The next day dined with Dr. Olbers, and saw with much pleasure the telescope with which he discovered his two new planets, and met Gauss. Olbers gave us an excellent dinner, and is a most amiable and enlightened philosopher. I spent a very pleasant day. He introduced me to a sportsman, who asserted, in the most decided manner, that the double snipe breeds in Hanover, and promised to send me young ones. He says the males assemble in the month of May, and make a great noise, and that they breed in the great marshes. I saw one in the Museum with the eggs, which seems to confirm his account.

“I find such difficulties made with respect to the chace here, that I gave up the idea, and on Friday came down to Bracken along and on the water, which has nothing picturesque; and this morning (14th), I am on the sea of Vauderagg. I am rejoiced that I made the excursion to Altona and Bremen: it has given me a better idea of human nature; for Schumacher, Olbers, and Gauss appear to me no less amiable as men than distinguished as philosophers; and they have all the simplicity, goodness of heart, and urbanity of manners, which ought to make us proud of their name, and of the influence of intellect and scientific pursuits upon the morals, the habits, and the affections.”

Amongst his note-books a few other vestiges of this



excursion remain. Of a poetical kind are some lines written at Copenhagen, as the date indicates, expressive of his reflections on the evanescent forms of things, and the permanency of intellect :—

“ Copenhagen, August 1, 1824.

“ Whatever burns consumes,—ashes remain ;  
And tho' in beauty and in loveliness,  
And infinite variety of forms,  
The primitive beings shone, their relics sad  
Have the same pale and melancholy hue.  
Such are the traits strong passions leave behind,  
Consumers of the mind and of the form.  
The auburn, flaxen, and the ebon hair,  
Take the same hoary hue ; the blooming cheek  
Of beauty, the bronzed brow of manly strength,  
And the smooth front of wisdom, sadly show  
The same deep furrows : intellect alone  
Does not so quickly waste itself ; but like  
The tranquil light which in the ocean springs,  
When living myriads in succession quick  
Sport on the wave, it lives, and in the storms  
And change of things appears more beautiful,  
Triumphant o'er the elements.”

The distinguished men of science whom he had the good fortune to meet he thus notices, in those sketches of character, which, as already mentioned, he amused himself in writing in his last days :—

“ *Berzelius* was the worthy countryman of Scheele, and certainly one of the great ornaments of the age. Indefatigable in labour, accurate in manipulation, no one has worked with more profit. His manner was not distinguished, his appearance rather coarse, and his conversation was limited much to his own subjects.”

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“ *Ærsted* is chiefly distinguished by his discovery of

electro-magnetism. He was a man of simple manners, of no pretensions, and not of extensive resources; but ingenious, and a little of a German metaphysician."

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"*Gauss* appeared to me a very superior man. I met him at the house of *Olbers*, in *Bremen*: a delightful philosopher, with a passion for astronomy only surpassed in ardour by that possessed by *Schumacher*. I was equally pleased with the manners, with the liberality, and social gaiety of these three celebrated men, with whom I spent one of the most agreeable days belonging to the later period of my life."

The following year after the conclusion of the session of the Royal Society, he visited the north of England; and during the Christmas holidays he passed a short time in South Wales. This I collect from letters preserved, which he wrote to his mother in his absence, and from lines giving expression to trains of thought composed amidst the wild and beautiful scenery of Westmoreland.

The latter are all of a serious, meditative kind. As displaying the workings of his mind, they may interest kindred minds; and in their humility, as well as in their lofty aspirations, they may prove edifying;—two considerations which induce me to give them, though they are unfinished fragments:—

"Ulswater, August 4, 1825.

"Ye lovely hills, that rise in majesty  
Amidst the ruddy light of setting suns,  
Your tops are bright with radiance, whilst below  
The wave is dark and gloomy, and the vale  
Hid in obscurest mist. Such is the life  
Of man: this vale of earth and waters dark

And gloomy ; but the mountain range above,  
 The skies, the heavens are bright. There is a ray  
 Of evening which does not end in night,—  
 A sun of which we catch uncertain gleams  
 In this our mortal state, but which for ever  
 Shines from afar, wakening the spirit of man  
 To life immortal and undying glory !”

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“ Ulswater, August 5, 1825.

“ It is alone in solitude we feel  
 And know what powers belong to us.  
 By sympathy excited, and constrain'd  
 By tedious ceremony in the world,  
 Many whom we are fit to lead we follow ;  
 And fools, and confident men, and those who think  
 Themselves all knowing, from the littleness  
 Of their own talents and the sphere they move in,  
 Which is most little,—these do rule the world ;  
 Even like the poet's dream of elder time  
 The fabled Titans imaged to aspire  
 Unto the infinitely distant heaven,  
 Because they raised a pile of common stones,  
 And higher stood than those around them.

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The great is ever  
 Obscure, indefinite ; and knowledge still,  
 The highest, the most distant, most sublime,  
 Is like the stars composed of luminous points,  
 But without visible image, or known distance.  
 E'en with respect to human things and forms,  
 We estimate and know them but in solitude.  
 The eye of the worldly man is insect-like,  
 Fit only for the near and single objects ;  
 The true philosopher in distance sees them,  
 And scans their forms, their bearings, and relations.  
 To view a lovely landscape in its whole,  
 We do not fix upon one cave or rock,  
 Or woody hill, out of the mighty range  
 Of the wide scenery,—we rather mount  
 A lofty knoll to mark the varied whole,—  
 The waters blue, the mountains grey and dim,  
 The shaggy hills and the embattled cliffs,



With their mysterious glens, awakening  
Imaginations wild,—interminable !”

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“ 1825.

“ And when the light of life is flying,  
And darkness round us seems to close,  
Nought do we truly know of dying,  
Save sinking in a deep repose.

“ And as in sweetest, soundest slumber,  
The mind enjoys its happiest dreams,  
And in the stillest night we number  
Thousands of worlds in starlight beams ;

“ So may we hope the undying spirit,  
In quitting its decaying form,  
Breaks forth new glory to inherit,  
As lightning from the gloomy storm.

This autumn he experienced increasing indisposition ; and, what was very unusual with him, he seems to have experienced some flagging of that extraordinary elasticity of spirit which had hitherto carried him lightly and joyously through life, over all its rubs and cares. Thus, in a letter to his mother, dated October 9th, alluding to a family circumstance which occasioned him some anxiety, he says, “ and being myself unwell, I feel more uneasy than if I were in rude health.”

The following spring, that of 1826, after an ailing winter, there was an increase of his indisposition. This is described in a letter to his sister, which he wrote on the occasion of our mother’s illness :—

“ June 2d.

“ MY DEAR SISTER,

“ I have been much grieved, and somewhat alarmed, to hear of my mother’s illness. Pray write me by

return of post, and say how she is, and give me a line every second day till she is convalescent. I hope, however, most ardently, that she is no longer suffering.

“Lady Davy is quite well; but I have been much indisposed, and now write with difficulty from rheumatism in my right hand and arm. I think I shall not be well till the weather changes.

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“I hope John will be promoted, and return in October for two or three months, and that we shall see you all well together in November. If it please God, I will certainly be at Penzance the last week in October, or the first in November. With affectionate love and kind duty to my mother,

“I am, dear Kitty,

“Your affectionate Brother,

“H. DAVY.”

The hope expressed in this letter, of a happy meeting of our family under our mother's roof, was not permitted to be fulfilled. Our respected mother, after apparently rallying from her first attack of illness, was suddenly carried off by a fresh accession of it. This happened in September, and my brother's health soon after sensibly deteriorated.

## CHAPTER VI.

Experiences a paralytic attack—Third visit to Italy through France—Particulars of him whilst at Ravenna—Verses written there—Extracts from his note-books and journals relative to his occupations, feelings, and course of travel—His return to England and visit to Mr. Poole—Salmonia, or Days of Fly-fishing—Notice of him as an angler—His last journey into Italy—Extracts from his journals with letters relative to this time—Paralytic seizure at Rome; account of this illness—Particulars of his journey to Geneva, and of his death on the night of his arrival—Notice of his last work, his “Consolations in Travel”—Particulars of his person, disposition, and habits—Letters illustrative of his feelings—Portraits of him—Estimates of his character by Mr. Andrew Knight, Dr. Henry, Mr. Poole, and an American—Concluding Remarks.

I HAVE mentioned, that soon after his mother's death, my brother's health sensibly deteriorated. He experienced more frequently troublesome symptoms, such as uneasy feeling and slight numbness of the right hand, and sometimes pain of the fore-arm, shooting up to the chest; with occasional inordinate action of the heart, and occasional pain and weakness of the right leg. By one of his medical advisers, the pain and numbness of the hand and arm, which on the whole were the predominant ailments, were attributed to an old sprain of the wrist; by another his indisposition was referred to increased flow of blood to the head; and by a friend, a physiologist, to weakness of the heart. He was rather disposed to follow the advice which was most agreeable



to the convivial epicurean habits of London society, and adopt a strengthening diet, as it is called, of animal food, than an abstemious regimen. For some time he ate meat three or four times a day; but he did not improve. When he delivered that discourse which was his last to the Royal Society, at the anniversary meeting on St. Andrew's day, 1826, it was done with such effort that drops of sweat flowed down his countenance; and those who were near him were apprehensive of his having an apoplectic seizure; and he was afterwards so much indisposed as to be unable to attend the dinner of the Society. That day he had the honour of being elected President the seventh time.

When I returned to England in December of the same year, I went to see him at the house of his friend, Mr. Watt Russel, in Northamptonshire, where he was on a visit. He looked well, but stouter than when I left him on my going abroad four years before. He complained of his hand and foot, and of general indisposition, yet he took exercise, and went out with his gun; and he was still on a diet chiefly of animal food, and on a large allowance, his appetite not being bad. We travelled together to London, and in a few days parted to go into different parts of the country.

About a fortnight after, when I was at Hilstone House in Monmouthshire, I had a note from him, dated London, begging me to come to him, as soon as I conveniently could, for he was ill. In less than two days I was with him, and I found him much worse than I expected, and labouring under a paralytic attack, affecting the right side. It had come on suddenly while shooting at Lord Gage's. On his arrival in town, to which he hastened, he had put himself under the care of his

old and kind friend Dr. Babington,\* and of Dr. Holland. The medical treatment employed appeared to have had little or no beneficial effect. As he gained strength, however, the symptoms gradually diminished, and we were very sanguine that he would recover completely.

Fortunately, the faculties of his mind were not impaired, and he had pleasure in the moderate exercise of them. During confinement to his room, he corrected the proof sheets of his "Discourses to the Royal Society," which were published in quarto, in January, 1827. From reading he derived much amusement, or rather, I should say, from being read to. Novels and romances were the kind of reading he then preferred, and for some time it was our almost constant occupation. He, however, then contemplated the time when he hoped to be able to resume his former pursuits; and the first undertaking he meditated was the finishing of his "Elements of Chemical Philosophy," after the same plan as that on which it was commenced,—of original research, and the verification, by experiment, of the results of other inquirers; a design which, unfortunately, he was never able to accomplish. In proof of his earnestness in this intention, I may mention that he now proposed to me to retire from the public service, and to live with him in future, for the purpose of co-operating with him in the scientific undertakings which he had in view.

By the 22d of January he was so far recovered as to

\* "Babington, the best and warmest-hearted friend, the kindest husband and father, and perhaps the most disinterested physician of his time; with good talents, and a fine tact, and a benevolence which created sympathy for him wherever he appeared, and I believe often cured his patients."—*MSS. Sketches of Contemporary Characters.*

be able to undertake a journey to the Continent. Change of air, the exercise of travelling, and change of scene, it was supposed, would be of service to him ; and still greater negative advantages were calculated on, in favour of his recovering abroad, in the absence of the many annoyances and causes of injurious excitement to which he was exposed at home, and especially as President of the Royal Society.

On the day mentioned above, we set out from London together to go into Italy. It was a dreary beginning of a dreary journey. The winter had been open till then ; that morning a snow-storm began, and continued all the way to Sittingbourne, where we slept. The following day was fine, and we had a pleasant drive to Dover. His conversation that morning was particularly agreeable, and principally on geological subjects. Many of his ideas, he said, on these subjects had been appropriated by others, and had been published without acknowledgment of having derived them from him, either through his lectures or in conversation. He, on this occasion, gave me the outlines of the geological sketch which he has introduced in his "Conversations in Travel."

The following day we crossed the Channel in the steam-packet to Calais, off which we arrived when the tide was out, and had to be put on shore over shallows, and through breakers by boatmen, who by their mismanagement and bungling, appeared to be entirely ignorant of their duties.

The next day was partly employed in preparing for our journey, and in finding a carriage suitable to the season. The one he purchased, a post-chaise, answered perfectly, and he used no other whilst on the Continent. We proceeded on the great Paris road as far as



Amiens. There we struck off to Compeigne, expressly for the purpose of avoiding Paris, and the allurements, or rather excitement, of its society, which he apprehended it would be difficult to escape if he stopped there. Had we been aware of the badness of the road, of the badness of the posting, of the delay in getting horses, and of the badness of many of the inns, we certainly should not have left the great road. The weather, indeed, was severe, and there was an unusual quantity of snow on the ground, which added to the difficulty of travelling.

Our plan was to go forty or fifty miles a-day between breakfast and dinner, which, with tolerable roads and horses, would have been easy; but frequently it was dark before we finished our day's journey. I remember, before we got into Compeigne we were benighted, and obliged to quit the carriage, the wheels of which were completely locked in frozen ruts, about a foot deep, at the beginning of a steep descent, and could not be extricated without assistance. Wrapped in his cloak, I helped him to the bottom of the hill, and he did not escape a fall or two by the way, from the slippery frozen state of the road. It was then dark. By good luck we discovered hard by a cottage, where we were kindly received; and whilst the men of the family went out to the assistance of the postilion and courier, we were accommodated with seats by a blazing wood fire cheerfully burning on a flat hearth in a great chimney, and had pleasure in seeing the comforts enjoyed by a peasant's family at this inclement season. Not unfrequently, from the manner in which the roads were obstructed with snow, we were under the necessity of travelling over ploughed fields. Though our carriage was tight, so as to exclude wind, and we were well provided with

warm clothing, and my brother had a feet-warmer constantly under his feet, yet we felt the cold considerably. The glasses were generally coated with ice, and the thermometer inside below the freezing point; and a bottle of leeches in the carriage pocket was frozen the day we left London, and continued so till we arrived at Reggio.

No one who has not been out of England can have an adequate idea of the discomfort of a French inn in winter. On arrival we were shown into a room without fire; and when a fire was lighted, for the first hour it was rather a source of annoyance than of warmth, owing to the volumes of smoke which it poured forth. We found the freezing temperature every where within doors, and the thermometer often, at a distance from the fire, was several degrees below the freezing point.

Nothing could be more dismal than the country and scenery the whole of the way to Lyons, especially in the great plains of Champagne,—uninterrupted plains of snow, as far as the sight could extend;—no object to arrest the eye, except a village here and there, rising out of the white waste, or a distant steeple, or some solitary tree. And in the towns in which we stopped, nothing to excite interest excepting the churches, which in this part of France are many of them splendid specimens of the richest Gothic, belonging, it may be said, entirely to past ages,—the majority of them neglected, and the few which were used and repaired in their interior, of desolate appearance, damp and cold like the tomb; with which were quite in character the priests who officiated in them to naked walls, reverberating the sounds of their chanting in a most melancholy manner. We often visited these churches,

and my brother never failed availing himself of the opportunity of falling on his knees, and in silence offering up a prayer.

It was with some hesitation that we took the road to Chamberry, to proceed through Savoy over Mont Cenis into Italy. In the deep Alpine valleys above Chamberry, we were agreeably surprised at finding less snow than in the low country, and less intensity of cold. Verdure here and there appeared, bursting out of the snow in sheltered hollows; and even amidst the snowy mountains, and the rivers almost buried in snow, and the pendant icicles, and the blue and frozen cataracts, there was a degree of liveliness imparted by the varied aspect of the larch, the birch, and the Alpine fir, which in forest masses so beautifully and gracefully clothe the mountains. In his valetudinary state even, he enjoyed very much this part of the road, especially between St. Jean de Maurienne and St. Michel, and St. Michel and Lansleburgh, where the scenery is of the grandest character, and appeared to great advantage, from the kind of weather we had,—a cloudy sky and drifting clouds, and partial gleams of sunshine, and occasional glimpses of blue sky, and of the peaks of the Alps of dazzling whiteness.

When we arrived at Lansleburgh, it was doubtful if we should be able to cross Mont Cenis: the accounts brought down by the peasants were of an unfavourable kind. There had been a storm of wind, and a fresh fall of snow. We watched the pines on the mountain heights with some interest, as indicating the state of the atmosphere in the upper region. The following morning, *en traineau*, the body of the carriage on one sledge, and the wheels on another, we made the attempt, and without difficulty reached the inn on the



summit. Here we were detained the remainder of the day, the wind blowing strong, and the snow drifting, and the road beyond impassable: and in this dismal situation we passed the night. Though we had a large fire in our bed-room, which was also our sitting-room, the thermometer in it was at  $20^{\circ}$ , and in the open air on the snow at  $10^{\circ}$ . The following morning, the storm being over, and the sky serene, and beautifully clear, we proceeded on our way, the Sardinian courier having started before us about an hour. Very soon we overtook his carriage, which was stopped by accumulated snow. A large number of people had been collected from the neighbouring valleys, and were hard at work, forming a road; but as we saw little probability of its being soon rendered passable for our carriage, my brother accepted the offer of two stout mountaineers, and was drawn by them down to Susa in a small Alpine sledge with safety and rapidity, though in a manner not very agreeable, at least for an invalid, owing to the great steepness of many of the descents, and the heat of the sun in the very clear calm sky, and the reflection from the snow. The carriage arrived many hours after, in the evening.

On entering Italy, we had hoped that we should have taken leave of snow and the rigours of winter; but we were disappointed. The snow through the whole of Lombardy was even deeper than in the passes of the Alps; in many places three and four feet deep. The scene was quite arctic, not only on account of the dreary waste of snow, but even more so from the carts and waggons of the country being taken off their wheels and drawn on sledges, as if the inhabitants were familiar with snow, and prepared for it. Owing to the severity of the weather, we stopped some days at Bologna.

When we arrived at Ravenna, in the first week of March, the snow was melting on the roofs of the houses, and was to be seen in the ditches some days after.

Notwithstanding this severity of season and difficulties in travelling, and various annoyances in connection with them, my brother, at the end of his journey, was decidedly better than when he commenced it; stronger, less paralytic, and more active. His own state and feelings at this period are well described in a letter which he wrote to his friend Mr. Poole about three weeks after his arrival, part of which I shall insert:—

“I am, thank God, better, but still very weak, and wholly unfit for any kind of business and study. I have, however, considerably recovered the use of all the limbs that were affected; and as my amendment has been slow and gradual, I hope in time it may be complete. But I am leading the life of an anchorite, obliged to abstain from flesh, wine, business, study, experiments, and all things that I love; but this discipline is salutary, and for the sake of being able to do something more for science, and I hope for humanity, I submit to it, believing that the Great Source of intellectual being so wills it for good.

“I am here lodged in the Apostolical palace, by the kindness of the Vice Legate of Ravenna,\* a most amiable and enlightened prelate, who has done everything for me that he could have done for a brother.

“I have chosen this spot of the declining empire of

\* The Vice Legate was Monsignor Spada Medici, to whom my brother was before known only by reputation; they then became friends. To know the Vice Legate was to love him,—so kind, so considerate, so graceful, learned and accomplished, and yet a very young man, not, I suppose then, more than 27. He had won the affections of the people

Rome, as one of solitude and repose,—as out of the way of travellers, and in a good climate; and its monuments and recollections are not without interest. Here Dante composed his divine works; here Byron wrote some of his best and most moral (if such a name can be applied) poems; and here the Roman power, that began among the mountains with Romulus, and migrated to the sea, bounding Asia and Europe under Constantine, made its last stand in the marshes formed by the Eridanus, under Theodoric, whose tomb is amongst the wonders of the place.

“After a month’s travel in the most severe weather I ever experienced, I arrived here on the 20th of February. The weather has since been fine. My brother and friend, who is likewise my physician, accompanied me, but he is so satisfied with my improvement as to be able to leave me for Corfu; but he is within a week’s call.

“I have no society here except that of the amiable Vice Legate, who is the governor of the province; but this is enough for me, for as yet I can bear but little conversation. I ride in the pine forest, which is the most magnificent in Europe, and which I wish you could see. You know the trees by Claude Lorrain’s landscapes: imagine a circle of twenty miles of these great fan-shaped pines, green sunny lawns, and little

of Ravenna, who were considered disaffected to the Papal Government, and had tranquillized the province. To my brother he showed every mark of kind attention and respect;—by his manner, wishing it to appear, as if he himself were honoured and obliged, in being allowed to perform acts of courtesy and kindness.—He was afterwards, at Spolito, in the same capacity of Vice Legate, during the conclave for the election of a Pope in the early spring of 1829. He had there prepared rooms to receive my brother, whose intention it was, to pay him a visit on his way northward from Rome, had his health permitted it.



knolls of underwood, with large junipers of the Adriatic in front, and the Apennines still covered with snow behind. The pine wood partly covers the spot where the Roman fleet once rode. Such is the change of time ! It is my intention to stay here till the beginning of April, and then go to the Alps ; for I must avoid the extremes of heat and cold."

And to show further his state in regard to feeling and thought, and the unsubdued energies of his mind, I shall insert some extracts in verse and prose from his later note books:—

"Ravenna, March 1.

"In ignorance of all things we assume  
 What reasonings most please us, and in things  
 The most unlike in form as well as essence  
 We trace analogies ; as if it were  
 A joy to blend all contrarieties,  
 ————— And to discover  
 In things the most unlike some qualities  
 Having relationship and family ties.  
 Thus life we term a spark, a fire, a flame ;  
 And then we call that fire, that flame, immortal,  
 Although the nature of all fiery things  
 Belonging to the earth is perishable.  
 The lightning, in its fierceness and its power,  
 Is of an instant only !  
 The meteor's blaze lightening the visible scene  
 As transient is !  
 And vainly should we search where these had been.  
 The solar light, when the bright orb has sunk,  
 Dwells not within known space ;  
 And that which kindleth the whole frame of nature  
 Has no abiding place, although its source  
 Is everlasting : it lives but to decay,  
 And in its course a million miles are nothing ;  
 It passes from and through the infinite.  
 So is our life of thought : we look not back  
 Beyond a few short hours,—a life, a day,  
 An age ; that period gone, we blend  
 With future, and with past, eternity."

## "THOUGHT.

"Ravenna, March.

" Be this our trust, that ages (filled with light  
More glorious far than those faint beams which shine  
In this our feeble twilight) yet to come  
Shall see distinctly what we now but hope,—  
The world immutable in which alone  
Wisdom is found, the light and life of things,  
The breath divine, creating power divine,  
The *One* of which the human intellect  
Is but a type, as feeble as that image  
Of the bright sun seen on the bursting wave—  
Bright, but without distinctness ; yet in passing  
Showing its glorious and eternal source."

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"Ravenna, April 2, 1827.

" Our life is like a cloudy sky 'midst mountains,  
When in the blast the watery vapours float.  
Now gleams of light pass o'er the lovely hills,  
And make the purple heath and russet bracken  
Seem lovelier, and the grass of brighter green ;  
And now a giant shadow hides them all.  
And thus it is, that in all *earthly* distance  
On which the sight can fix, still fear and hope,  
Gloom and alternate sunshine, each succeeds.  
So of another and an unknown land  
We see the radiance of the clouds reflected,  
Which is the future life beyond the grave!"

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"Ravenna, April, 1827.

" Oh couldst thou be with me, daughter of heaven,  
Urania ! I have now no other love ;  
For time has wither'd all the beauteous flowers  
That once adorn'd my youthful coronet.  
With thee I still may live a little space,  
And hope for better, intellectual light ;  
With thee I may e'en still in vernal times  
Look upon nature with a poet's eye,  
Nursing those lofty thoughts that in the mind  
Spontaneous rise, blending their sacred powers

With images from mountain and from flood,  
 From chesnut groves amid the broken rocks  
 Where the blue Lima pours to meet the wave  
 Of foaming Serchio ; or 'midst the odorous heath  
 And cistus flowers, that clothe the stream-worn sides  
 Of the green hills, whence in their purity  
 The virgin streams arise of mountain Tiber,  
 Not yet polluted by the lowland rills,  
 Or turbid with the ruins of the plains,  
 As when in sullen majesty he murmurs  
 By the imperial city's fallen walls,  
 Laying bare the bones of heroes, and the monuments  
 Of generations of the ages past ;  
 Or rest might find on that cloud-cover'd hill,  
 Whose marble rocks are clothed with brightest green,  
 Where thousand flowers of unknown hues and names  
 Scent the cool air, rarely by man inhaled,  
 But which the wild bee knows, and ever haunts,  
 And whence descends the balmy influence  
 Of those high waters, tepid from the air  
 Of ancient Apennine, whose sacred source  
 Hygeia loves : there my weary limbs  
 I might repose beneath the grateful shade  
 Of chesnuts, whose worn trunks proclaim the birth  
 Of other centuries."

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"The passions, like the mirage, or that state of the atmosphere produced by intense heat, which is the cause of the *fata morgana*, hide near objects and magnify and exalt distant ones, so that the traveller cannot ascertain their relations."

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"What is the reason that selfish, proud, and ill-tempered people like foreigners in their train or as their servants? Because their countrymen will not live with them :—they catch all the intonations of peevishness, bad temper and annoyance, which escape the coarser ears of foreigners."



“Men of high rank, either in the House of Commons or of Peers, are mingled with their fellow-men and taught the ordinances of common society, and find themselves in many respects not equal to men, their inferiors in rank and fortune; public schools also early discipline their minds, and form them for the world. But females of high rank, remaining perhaps almost ignorant of their great advantages before they enter life, are little fit for the refined intercourse of social life. A woman of rank, without beauty or fortune, is sometimes very agreeable; a handsome countess without reputation for talent is now and then amusing; but a handsome or accomplished and literary duchess is beyond all bearing. She has all the disadvantages of a sovereign princess, with the additional one of not being responsible, and of caring little for public opinion.”

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“The women of Italy have more of character than the men, probably because the female character is mere imitation, and many of them appeared to be natives of other countries; whereas the men have all the hereditary feebleness of a worn-out people. The Italians, however, of Upper Italy, are so much superior to those of Naples and Rome, that they may be regarded as a different race; yet of distinguished men, even in Upper Italy, I have found few, who may not be considered rather as belonging to the Alps than to the plains, and belonging in fact to what the ancient Romans considered as Gauls. Volta, Canova, Scarpa, Monti,—these names, which are glorious now, and would have been glorious in the best ages of the world,—are all mountaineers.”

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“This species of composition (the Waverley Novels)

does not appear to me very difficult,—for history, anecdotes, and biography furnish abundant elements for it. Times so near as to be highly interesting, yet covered a little by the mist of time, are always peculiarly fitted for romance,—for we like to renew our acquaintance with great and remarkable persons, who have influenced the destinies of our own times and nation; and there is, I believe, no one who would not rather be acquainted with Elizabeth of England than with Tamerlane. The history of the \*

that which fits all ages and countries, the abstraction of character,—the algebra or general language of life, is much more difficult; and though I am delighted with the works in question, and should be rejoiced if the wonderful and powerful author would furnish one in a quarter instead of one in a year, yet I doubt of the permanence of their fame, or the duration of the interest of his works.”

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“Pleasure, creative;—pain, destructive.”

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“Mucus, or hair, or feathers, may be considered as the substance lowest in the scale of organization; and nerve, or the substance of brain, as the highest,—yet, is it not possible that these two substances, so essentially different in their nature, may be the same or similar compounds in the *chemical* history of animated beings?”

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“A correction of Dr. Johnson’s bon mot,—all shallows are easily seen through,—and the less the depth the more easily,—and the same water seems very clear in a shallow pool, that looks very muddy in a deep one.”

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“In travelling through the Alpine countries of

\* The word omitted could not be deciphered in the MS.

Europe, in proportion as you are more remote from great cities you catch the fashions of one, two, three, four centuries rising up like ghosts."

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"The grand object both of education and of government should be to make men *good* and happy. They may be so without being wise and powerful. They may be wise and powerful, and not good and happy,—and, they may be *all*, wise, powerful, good and happy."

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"The person who becomes an orator by public practice, is like a stream which is fed from known sources, that is, tributary visible rills. He who bursts forth at once, like a river from a subterraneous cavity, has yet been fed by similar sources, but they have been private and secret, under ground, and are purer, having been collected from the air and hoarded in the rock."

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"The coldest time of the twenty-four hours, is not in the darkest night, but at the end of twilight, before the rising of the sun. Analogy to knowledge and civilization."

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"The false light of love, like the glare of the stormy sunset, gives its own brilliant colour to every object on which it falls, and lights up even the stagnant pool and muddy lake with tints of beauty."

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"Our *real knowledge* is but to be sure that we know nothing; and, I can but doubt if this be a curse or blessing. Those who hope, trust and believe, are surely happier far than those who doubt;—and the submissive child who of his father's goodness is secure, is far more blessed than the froward one, who sets himself



against his powerful will, which after all his struggles and vain efforts, he must at last obey,—rebellng against the love which would have made him happy. Is not this the history of man?—of that bright and beauteous garden, where in innocence and ignorance he lived and loved, till the false taste of knowledge made him wretched, and he *knew that he must die*. And, is not this the glory and the consummation of the Christian faith, which gives him back his innocence, his hopes, his confidence in God,—which through his life still gilds the future with a golden blessing of an expected immortality. Man fell in Adam;—knowledge was his bane;—man rose in Christ, recovering his ignorance, or substituting *hope*, for what was *doubt*.”

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As long as I remained at Ravenna, my brother's time was chiefly spent in taking exercise, in reading, and conversation. About eleven o'clock he commonly got on horseback, and with his gun and dogs, either wandered through the beautiful and extensive avenues of the Pineta, then exhibiting the first burst of spring, or followed the embankments of the marshes of La Classe, in quest of his favourite petzardone; or, if disinclined for horse exercise, walked with me on the ramparts of the city, then covered with fresh green turf, and well exposed to the mild and freshening breezes which at that time prevailed. Reading occupied a part of every evening, mixed with conversation either on what I read to him or on miscellaneous matters, and occasionally interrupted by a game at écarté. The reading he then preferred was Lord Byron's poems, of which we had procured a convenient travelling copy, in one volume, at Calais. The place gave additional interest to these

poems: he had there met their noble author and the lady of his love\*, under whose influence the muse of Byron had made some of her best efforts; and at that very time this amiable and talented woman was at Ravenna residing with her family, and occasionally honoured our invalid with a visit, even within the walls of a palace, the official residence of those she must have considered the enemies of her race, the most respected of whom, including her father, were then in exile in consequence of their free political opinions in opposition to the government.

After I had parted from him in the beginning of March, to return to Corfu, his health continuing to improve, he became capable of more exertion, and had greater power of amusing himself. He resumed some of his scientific pursuits, and followed natural history in connection with shooting, with much zeal. The weather being favourable, he spent a considerable part of each day in the open air; and when within doors, he found occupation in noting down his observations, in examining the birds which he had shot or purchased, or in making experiments.

The contents of his note-books kept at that time are copious, and fully confirm what I have just said. Under the head of "Hints and Experiments in Physical Science," he gives an account of various experiments which he either made or proposed to institute, relative to magnetism and electricity.

"He first proposes to try if there is not a radiation of magnetism from the sun, and likewise from the moon. "If so," he says, "needles may become magnetic on

\* The Countess Guiccioli.

exposure, though wrapped in opaque matter, as tin foil.”\*

He next details several experiments which he made on the effects of light on needles, the results of which were not altogether decisive. He commenced them on the 23rd of March; and they are introduced with this remark: — “The results of Baumgartner† may depend either upon the *colour* given to the steel by oxidation, or to the negative effects of the oxide as an electrical agent.”

On the 30th of March, he writes — “I had every thing ready for three sets of experiments on the electricity of the torpedo, but the fisherman failed me,—the animal was dead. I had intended to try, first, if the shock affected the needle; secondly, if it magnetised steel; thirdly, if it produced heat.”‡

On the following day he enters an account of an experiment undertaken for the purpose of ascertaining if any electro-magnetism follows the nervo-muscular ac-

\* This experiment, of exposure of needles in metallic foil, to the light of the sun and moon, I have made at Malta, when the state of the atmosphere has been most favourable, but without effect; no sensible magnetism was imparted to the needles. Nor was there any effect indicated by change of colour, produced on moist chloride of silver, enveloped in platina foil, similarly exposed; but the heating power of the sun’s rays was found to pass through the opaque medium; thus, when the rays of the sun were concentrated by means of a lens on platina foil resting on the hand, the sensation of heat below the focus was often painful, though the temperature of the metal was, as well as could be ascertained, very little raised. I venture to mention this result, hoping it may lead to further inquiry.

† *Annales de Chimie et de Physique*, vol. xxxiii. p. 333.

‡ These experiments I have tried,—and with distinct results,—the needle of the galvanometer has been powerfully affected; steel magnetised, and heat produced; and in addition, chemical decompositions effected.



tion in the galvanic experiment of the contraction of the legs of a frog. He thus describes the result:—

“*March 31.*—Tried an experiment on the thighs and legs of a very large frog recently killed. Wire of platinum was connected with the multiplier, and with the two crural nerves, and a large piece of foil of zinc was placed under the thighs; the communication was made through the multiplier; violent contractions of the muscles took place, but there was no magnetic effect. The muscles were washed in weak sulphuric acid, but still there was no magnetic effect; but when the platinum was inserted deep into the muscles, so as to make a better conducting chain, there was magnetic effect. The nerve is evidently not a sufficiently good conductor to transmit electricity enough for this effect, *and no electricity is developed by the contraction.*”

Under the head of “Natural History, Notices, and Notes,” he collected a great deal of information respecting various objects, and obscure parts of natural history about which he was interested, especially relating to birds and fishes: as the locality of the ombre chevalier and its peculiarities; the migration of animals; the history of the double snipe or petzardone; the generation of eels; the different species of the genus salmo, &c.

These notices on physical science and natural history were made between the 12th and 23rd March, and they are followed by others on the latter subject, and on meteorology, sufficiently showing the activity of his mind. Indeed, hardly a day passed whilst he remained at Ravenna, that he did not make some entry into his note-book, describing either a fact he had observed in his day's exercise, or some information he had collected from a brother sportsman, or the result of a dissection of a bird or fish, or a hint for an experiment, or the state

of weather and his own feelings as an invalid, intermixed occasionally with some short expression of religious and grateful feeling. I shall introduce a few instances : —

“*March* 16th.—The high soaring of the swallow indicates fine weather; because the warm air is *above*, and in the warm air flies are found, and the swallows follow them.

“Here, at Ravenna, the 14th and 15th of March, when the thermometer was at 60° or 58° in the evening, I saw bats flying about, the first that have appeared since December 31st, when I saw them in England on the coast of Sussex. Have they intervals of torpidity, and do they wake for a day and then sleep again? This evening (the 16th) the thermometer was below 54°, and no bats made their appearance.

“On the 14th I made use of two leeches, which bit immediately, and performed their office well; yet they had been frozen from January 23rd to February 22nd, and had been sometimes exposed (as on Mont Cenis) for more than fifteen hours to a temperature below 10° Fahrenheit. They were thawed very gradually, and appeared dead when first thawed, but recovered in some hours in a warm room. They had all (there were twelve) adhered together in a sort of ball, and were precisely in the centre of the bottle, at the greatest distance from the cooling causes.

“24th. — This day I dissected a spigola (*Perca marina*), a fish said by Cavolini to be an hermaphrodite. I could see no distinct melt, so as to be convinced of its double sex. The ovaria were very small loose bags, and of course were quite in an immature state. It was said to be a pound and a half.

“29th.— Beat the marshes, where a sportsman told us

he had seen a petzardone yesterday, but found nothing. Met a sportsman, who had beat them before in the morning, and who had killed a double snipe, which I bought. Examined it minutely. The legs as well as the breast spotted; there was no red behind the ear; the legs of this were pale green. My guide says that one was killed on the 24th; they are now certainly come.

“Saw a crane at the Classe this morning, a magnificent bird. Saw an eagle last week soaring above the Pineta.

“*April 6.*—Did not shoot, but returned *thanks* to the Great Cause of all Being, for all his mercies to me, an undeserving and often ungrateful creature; but now most grateful. May I become better, and more grateful, and more humble-minded every day!

“A beautiful day, but a strong and cold-feeling wind: thermometer in the shade at three  $63^{\circ}$ , and its moistened bulb  $53^{\circ}$ , so that the difference is  $10^{\circ}$ . Wind east.

“*7th.*—A sportsman here, Civilieri, says he has always seen petzardone from the last week in September till the middle of October. Do they come singly and not in a flock, being guided by the search of food, and not by the reproductive instinct?”

He remained at Ravenna till about the 10th or 11th of April, and then proceeded northward, for the purpose of avoiding the daily increasing heat of Italy, with the intention, which he fulfilled, of passing the summer in his old haunts amongst the eastern Alps.

The journals which he kept during this period, like the one referred to, are very descriptive of his state and feelings, as well as of his pursuits and zeal in prosecuting them. Many parts of these journals are to me very affecting, as, when recording his wretched health and



often miserable sensations, during the struggle he was unremittingly making by all possible means to get rid of his ailments, "*Valde miserabilis!*" is not an unfrequent expression; and commonly accompanied with mention of diminished power of limbs and general feebleness, with pains and numbness of limbs. Sometimes he is in despair of recovery, and resigned to his fate; at other times indulging in hope, thankful for feeling better, and expressing thanks (and he does it very often) by the use of letters, such as G. G. D., O. O. O., or G. O. O. D. There is consolation in witnessing this elasticity of mind, and the power of enjoyment also which he possessed in the exercise of its best faculties. In him, mind seemed to triumph over matter, and the mental part over the corporeal; and his own instance is one of the best I know in favour of the train of argument he was wont to maintain against the materialists, who hold organization to be all in all, and life and intelligence results merely of corporeal arrangement.

The natural strength of his mind, it appears to me, was very clearly manifested under these circumstances. Dependent entirely on his own resources; no friend to converse with; no one with him to rely on for aid, and in a foreign country, without even a medical adviser; destitute of all the amusements of society; without any of the comforts of home—month after month, he kept on his course, wandering from river to river, from one mountain lake and valley to another, in search of favourable climate; amusing himself with his gun and rod, when sufficiently strong to use them, with "*speseranza*" for his rallying word. But all this will better appear in the extracts which I shall give from his journals, and which, for the sake of brevity, I shall introduce as fragments.

From Ravenna he went by way of Gorizia to Laybach, in Illyria, where he arrived on the 19th of April.

“*Gorizia, April 15.*—The country beautiful, in the first youth of the year, quite a garden cultivation round Gradisca and Gorizia; a good mode of cultivating the vine by training it from one pollard cherry-tree to another; the cherry-trees are so cut that a few perpendicular shoots for fruit remain.

“The Isonzo of a beautiful pale azure, with slight milkiness. I could see no fish. This river from a subterraneous source, and rising in limestone.”

He remained at Laybach till the 23d of May, daily occupied in shooting and fishing in the adjoining rivers and marshes, in connection with the pursuit of natural history; and, in point of health, gaining rather than losing ground.

“*Laybach, April 19.*—Ascertained by disagreeable experience that rivers which run from limestone rocks are not always clear. The Wipaco, which on Monday was beautifully clear, though large, became, after the hard rain of a night, milky, and I could not raise a fish; and they say it will be two or three days before it is clear again.

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“24th.—Yesterday went to the Save, which on the 22d was small and blue; this day it was at least ten times as large, and quite foul, like the Drave in summer. This day went into the marshes in the boat; found one jokelta, which I killed,—a fine large one, which my chasseur says is a female. The male, he says, is smaller and darker. Found a quail, which I likewise winged, and now keep alive to observe its habits.

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“28th.—There are no eels, I am told, in any of the

*rivers* that communicate with the Danube. The eels I saw here in the market were from Trieste. There are no eels in the Chernate-see, or in any of these rivers. Is this owing to a want of the congers in the Black Sea, or to some great fall in the Danube, which they cannot pass ?

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“ Saw two eagles, one of them very large, with a white tail, followed by a flock of crows. The weather is now become beautiful ; the mountains, which last week seemed quite near, now appear at a great distance ; the air is become dry.

“ The quail, who was very quiet, has become very impatient, and pecks at the window constantly.

“ 29th.—Went to the fall of the Zeyer, a beautiful spot ; fine wooded hills in the near view, and the bold and snow-clad mountains of Carniola and Carinthia beyond. The water beautifully clear and blue. Saw great quantities of fish showing themselves in the water, with bright sides, called here breet fish, or bred fish. Query, the Ida carp ?

“ They said there were hucho, grayling, and trout ; but I caught nothing ; and from the quantity of coarse fish, I doubt if it is ever a good fishing spot. But the day was as bright as the river,—sun without a cloud ; and I was at the spot in the worst time of the day, between one and three ; saw a very few flies, like the granam, but there was no rise of fish.

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“ *May 2.*—Went to the Kaltenbrun, or Fall of the Lubiana. Saw some huchos rise at small fish, and put on my trolling tackle ; was exceedingly unlucky : lost two sets of hooks, and at last hooked a large hucho, I think near two feet long. He played manfully, and



fought for a long while in the great deep rapid below the bridge; there was no landing place. He was hooked with minnow tackle. I threw my rod into the water, which was recovered by my assistants, and I got him, fairly tired, to land; when my courier, in his haste to snatch him up, broke the hooks which held him, and let him slip into the water, where he finally escaped. I never saw such a piece of ill luck, after so many narrow escapes, before. I think he was above seven pounds, but fought with less energy than a salmon—much as a trout would do. He took a small roach.

“The views were extremely beautiful, and the mountains appear in the ride round the Kaltenbrun rivalling those of Switzerland in grandeur,—the whole scene abounding in beauty.

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“6th.—Temperature only 52° at six (N.W.)—rose above 62° in the middle of the day. Went to a small stream called Kleingraben, where I caught a grayling with a fly, and a hucho with a small fish: the hucho was about a pound, with black spots, a white belly, and very narrow compared to its length, about the ratio of six to thirteen, but thick. Dorsal radii, 11. Pectoral, 15. Ventral, 10. Anal, 11. Caudal, 20, or 21.

“The huchos in this last stream have, probably, less food than in the Laybach river; for I hooked a small one with a fly, but this escaped; and I hooked another larger one, probably more than two pounds, who likewise escaped with a small fish. These fish seem peculiarly fitted for the tributary streams of the Danube, which abound in coarse food for the hucho. A hucho would starve in most of our mountain rivers.

“These huchos, this day, ran with great violence at

the small fish, which were roach and dace; and yet the stream was a clear mountain stream, running over limestone. The guide says there are few or no trout in this stream, which is haunted by huchos and grayling; and the huchos are of all sizes. This seems to show that it is not a fish which goes to the sea after being born. The hucho I dissected this day was a male, but the melt very slightly developed, and it evidently would not spawn this season. Quere, is residence in the sea, or large river, or lake, necessary to give full development to the sexual organ, or is it a phenomenon dependent on age? The hucho seems a solitary fish.

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“7th. — Observed the difference between roof of *thatch* and of *slate*, after the rain. The rain poured in torrents from the slate, but less violently from the thatch; but the thatch *continued dripping* when the slate was quite dry. This offers a good analogy to drained, or rocky, or cultivated countries, and boggy or wild countries. The rivers in one case are rapid, and soon exhausted torrents; dry in summer. In the other, nearly perennial and equable streams.\*

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\* Many of our mountains and uncultivated hills—all of them, indeed, more or less, perform the part above alluded to—referred to boggy and wild countries. The lichen and moss, mixed with other vegetation with which their sides are covered, nourished by the moisture of passing clouds, grow luxuriantly and form beds, which act the part of sponges. Like sponges, they absorb the water of rain and mist;—swelling with excess, shrinking with deficiency, and so tending to be the sources of perennial streams. In the middle of the dry summer of 1835, being in Westmoreland, I was much impressed with the facts I have alluded to;—when the fields were parched below, after a drought of a month, I found the moss-clad sides of the higher hills and mountains in a moist state, and water oozing from them. These declivities are not only sources of moisture, but of pasture, fuel, and manure, and perform an important part in the economy of nature. The grasses mixed with the

“May not the hucho be originally of the sea, and have, in course of ages, changed its habits, but preserved the instinct of migrating from the larger to the smaller rivers to *breed*; and, probably in winter, leave the Alpine torrents for the warmer and deeper streams of the Danube, and its tributary large feeders, the Drave, the Save, &c.?

“To examine if there be not varieties of these fish depending upon the waters, which they haunt, like salmon. The hucho here has no spots on the fins; but as yet I have closely examined no large one.

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“12th.—Wet day, thermometer 57°. Moist, thermometer 55°. I saw yesterday in the Laybach river the alder fly, and some few olive May-flies. Went in the rain up the river, and found a great number of rails. Shot in a very short beat nine rails and a quail, and chasseur one rail and one quail. My bag this day the best I have had—twelve. The dogs behaved well; and the rails, though they ran hard, were most of them raised.

“These meadows seem excellent for them; there is much water; they are now too grassy for jokelta; but the short grass forms the haunt of the quails, and the long grass of the rails.

“It would seem as if all the migrating animals moved onward till they found their proper places. First, common snipes come here; then, when the grass is too long for them, jokelta; and then rails. The jacks

moss afford summer pasture. The peat, which slowly forms underneath from accumulation of vegetable matter, dead and decomposing, yields fuel; and the same, when washed down by the heavy rains, has a fertilizing effect where it rests, and thus acts the part of a natural manure.



breed in the marsh, which no other birds except plovers haunt.

“The male rail has a larger body and a darker throat, and more of blue feathers. One of the rails shot this day was with egg.

“Thermometer at four, 63°; rain over, but moist, thermometer 61° only. Weighed a male quail; it was 1600 grains: and a male rail, the largest I believe of ten; it was 2675, and larger than most of the others by three or four hundred grains. The sizes of the males and females not determinate. Some males larger than some females, and *vice versâ*. The male rail known by blue feathers in the throat, the female by the yellow.

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“The rails now in great abundance, and likewise the quails. I have no doubt, if I were well and so disposed, I could kill thirty rails in a day and twenty quails.”

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We shall now follow him in his further wanderings through Upper Austria, Bavaria, and Switzerland, back to Illyria; wanderings in which he wiled away his time from the 23d of May, when, as already mentioned, he quitted Laybach, to the 11th of August, when he returned to it:—

“*May 25.*—A disagreeable day’s journey to Gratz; hot and windy, with an oppressive air (*sirocco*), and the dust always before the carriage, Temperature at Gratz too high, and the air feels oppressively warm. Thermometer in my room window 64°. Remarked that the dogs (German) attack whoever does not stink of tobacco, it being characteristic either of a beggar or a stranger.

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“28th. *Eisenharz*.—A beautiful day. Passed some snow on the road, and found the temperature agreeable. The whole scene round this place fine: snow in spots on the mountains; but wood and rock enough to give variety. Comfortable inn. Thermometer in my room  $56^{\circ}$ ; in the window, at nine,  $52^{\circ}$ ; and as the night is clear, it will probably be much lower.

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“29th.—Went to the Leopoldsteen-see. Caught in the Reva, running out of this lake, four trout, one beautifully coloured like a char, except that the spots were vermilion. Struck this day by the extreme similarity of the char and ombre chevalier. A large char, got from the lake, was exactly like it in colour of flesh, and differed from it only by more pink on the belly. In my window at nine, thermometer  $55^{\circ}$  after a beautiful day.

“From the similarity of the char of the Leopoldsteiner Lake, and the ombre chevalier of the Lake of Borguet, I am induced to make some observations on the physical causes which, by changing the habits, in many generations may change the forms of fish. The trout, when it feeds principally on fish, must be extremely active and strong; and may, from its predatory and mobile habits, acquire large teeth, large fleshy fins, thick skin, and great pectoral fins for turning; when it feeds on shell-fish, it may gain the stomach of the char and its colours, as in the Gillaroo trout: and the char, when it becomes large, is extremely like, if not the same with, the ombre chevalier. The colour likewise varies with the water; in the clear water coming from this lake, and the Koenig-see, the trout are beautifully coloured, probably from the influence of light,—silvery white, with bright vermilion spots. I have seen the

same differences in Cornwall at Castle a Denis, which are continued by generative impressions: two streams, one from a moor yellowish brown, producing black and yellow trout; one clear with a sandy bottom, producing white trout with red spots. There are in the Leopoldsteen-see *lacts forelle*, large trout 18lbs. and more, with silvery bellies and red flesh. Are these great char, or trout like those of the Lago di Garda?

“The habits of the spawning of fish must be influenced by weather; the char I got this morning with mature eggs was just about to spawn, yet in England they spawn in winter.

30th.—A beautiful day, thermometer  $58^{\circ}$  at eight in room, and  $60^{\circ}$  in window; warm. I went in the carriage to the fall of the river that feeds the lake. The scenery very beautiful; fine woods, with lawns in the middle of them, and some spots of beech and oak. The river clear and cold. The trout lying at the bottom, and did not take any notice of the fly. I never saw a clearer stream; the intervals of grassy lawns covered with flowers; a beautiful species of dwarf sweet-smelling rhododendron. Fished again in the river running from the lake, but raised only one fish; no fly on the water. Is this owing to an approaching storm? Thermometer  $65^{\circ}$  in my window, and  $66^{\circ}$  as the storm began with rain and thunder.

“Ascertained that the char is not distinguished by colour as to sex, for of two pink fish one was male and the other female; and of two others almost as pale as the ombre chevalier, there was the same difference,—one male and the other female. It is now raining hard, yet the thermometer is rising, and is now nearly  $67^{\circ}$ . Is the vapour from the warm air, which has been rising



all day, condensed, and coming down in rain, and bringing with it warm air? There is a perfect calmness; half past six. The scenery round the upper part of the lake very magnificent. Nature in her rudest dress, but not devoid of beauty. Wood and rock predominant over snow; for even in the upper peaks it is only in patches.

“Deo O. O. O. and H. A. and G. G.

“31st. *Eisenharz*.—Another beautiful day. Thermometer at four in window  $54^{\circ}$ ; bright blue sky, and the swallows soaring high, but not higher than yesternight in the storm, when the red light of evening, shining upon the rain clouding a mountain and a broken rainbow, gave a peculiar character to the view; one great peak in sunshine, others black from clouds and reflected shadow.

“Went to the waterfalls by the mountain road; views very fine, and ascent and descent tremendous. Saw none of the Alpine animals, though there are said to be many chamois, and great gras. Returned to the river, and fished for half an hour, and caught with the black fly three trout, exactly like the burn trout of England, Ireland, and Norway. The day not so hot to my feelings as yesterday,—more wind; the thermometer under  $65^{\circ}$  at five in my room. The largest trout that I caught this day has ova developed like most of the char, but far from mature. I have seen no fish in which the ova were so mature as the char mentioned the 29th. After two appears to me the best time for fishing in these Alpine torrents; the water is then warmest, and the fish come to the surface.

“At nine the thermometer, which had been from  $65^{\circ}$  to  $63^{\circ}$  till eight, had fallen to  $60^{\circ}$ ; a beautiful night,

with a crescent moon and a blue sky. In the lake here I observed very large minnows; so that there are trout, char, and minnows.

“*June 1. Eisenharz.*—A beautiful day for the journey to Admont. The road by Raffling very beautiful, but the mountains high, and I did not arrive at Admont till nine o’clock; was thirteen hours on the road, and three of them owing to accidents.

“*2d. Admont.*—Thermometer at 65° in the window in my room. The views very beautiful; but, alas! I cannot enjoy them. Though weak by evacuations, I have a head-ache, and I fear some congestion of blood in the brain; yet I have fasted and kept up constant excitement on the nape of the neck by acetic acid, and I have applied since I wrote three leeches to the temples, and behind the ear. Thermometer 67°. Here are stags, roes, and chamois surrounding this secluded residence, and for a strong and youthful lover of the chace and of nature it would be a delightful residence.”

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“*4th.*—Left Admont for Aus-see,—a wet day. At Aus-see almost cold: thermometer in window 54°. The river very full, and the high mountains all covered with snow. The dark clouds give a peculiarly fine effect to the scenery, and the abrupt, pale rock contrasted with the dark pines. It is a very striking place in wood, rock, lake, and river scenery.

“*5th.*—Rain in the morning, but cleared at eleven o’clock. Went to the river that runs out of the Oeder-see; very beautiful scenery. I caught ten trout, one about a pound, like the brook trout of England. The sabling lives here well in stews in the river. A fisherman of Aus-see went with me. His flies had a hair-link too coarse; his mode of fishing with a minnow curious, and

not bad, had his tackle been finer,—a loop of lead, two hooks; the lead supplies the head, so that it is the drop



minnow reversed. He caught two fish to my ten. Char spawn here in October; how different from Leopoldsteen-

see at Eisenharz! Fisherman uses ants' eggs on the hooks of his flies, and he says with success.—Quere, are they taken for cadis?"

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"6th. *Aussee*.—Thermometer in window  $56^{\circ}$  at half past seven. Clouds hanging on the mountain. Went to the *Æder-see*, a beautiful small Alpine lake surrounded by pine woods and high mountains. In the lake, and the river which empties it, caught with a fly twenty-one trout, and three chubs; the trout brook trout, herring size or larger. How did the chub get into this high lake, where trout and sabling are the natural inhabitants?

"The lake trout, even when half a pound, were red, like salmon; the river trout, white; yet the skin of the river trout was much brighter; taste equally good. The river trout must exert themselves more; does this exhaust their fat?

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"10th.—This evening admired the fine mountain scenery, which for the first time was distinct; the few clouds were below the summits of the mountains, white in the sun, and almost as white as the snows above them. The new-fallen snow is nearly melted; but large masses remain on all the tops of the mountains, and in the gullies.

\* \* \* \* \*

"11th.—Weather improved apparently at eight, but



white clouds on the breasts of the mountains ; gleams of sunshine ; thermometer at 60° in window.

“This has been the finest day I have seen here, but the evening is becoming showery. All day it was fine, proving the truth of the evening rainbow, which was beautiful yesterday at eight P.M.

“I went to the Grundal-see, and made a piscatory voyage to the farthest lake, where the river enters from the other lake. Killed there nine fine trout, two about 2lbs English or more, and in fine season. In the lower part of the lake took another, and three chub. Was rowed by the fisherman and his wife. Took a char from his stew which was excellent, — nearly a pound. The scenery was very beautiful, and the lake so calm that the mountains were seen with their clothing in the lake, so that a reflected picture of them was below.

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“12th.—Went to Alt Aus-see, a beautiful Alpine lake; but could see no trout worth taking, as the fishery belongs to the peasants.

\* \* \* \* \*

“13th.—Thermometer in room 60°. One leech to temple (four yesterday). Went to Oeder-see; but the water was coloured from the rain of last night, and I caught nothing but chub. A disagreeable day; rain, with alternations of hot close sunshine. Returned at three of the clock, valde miserabilis! after trying the river a very little. I have not been so miserable since I was first attacked; whether it is the exhaustion of five leeches and purging, or whether there is some mischief brewing in the vessels of the brain, I know not; but, whatever my fate may be, I have nothing to reproach myself with, either in physical or moral discipline; and if I disappear like poor Raffles, voluntas est Dei op om.

I have been less irritable, and have had nothing to annoy me,—good inn, honest and civil people, fine scenery, and now not bad weather, and yet I feel ill and oppressed; yet I have excited the nape of the neck, which discharges, and have now put a small blister on the left thigh.

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“14th.—*Ischl*.—The road from Aus-see beautiful, but temperature much increased; a day of bright and continual sunshine. Thermometer in the room here from 73° to 74°. The Traun of a beautiful green, rather paler than the Rhine. It is now very large, but clear.

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“15th.—Left *Ischl*. A thunder-storm at five in the morning had fallen, and sent the roads into the Traun, which was quite foul between *Ischl* and *Aber-see*. Took boat at *Aber-see*, one post from *Ischl*, and came in two hours and a half to *Gmünden*. The views in the upper part of the lake very beautiful and wild, and the journey from *Ischl* abounding in picturesque views. The Traun falls out of the lake at *Gmünden*, green, and now very large, but beautifully clear. I fished below the town, and between six and half past seven, I caught eight or ten trout, and grayling nearly in equal number. One trout was nearly three pounds, a beautiful fish,—black and red spots, and yellow belly. Two grayling were between a pound and a half and two pounds, and had the yellow belly so marked in Continental grayling. Temperature here 68° now in my room, at nine o'clock. It has been a cloudy day, with some threatening of rain, with some fulmen brutum.

“16th.—Bright sunshine. Thermometer in my room 69°. Went to the fall of the Traun, which was very

magnificent; rain came on in my return; the water was at least ten times as much as when I was there nine years ago, and the fall in consequence more magnificent, beautifully clear and green; the white foam and the green tint like those of the fall of the Rhine at Schaffhausen. Fished, but caught only one grayling. The water far too high, and the fish cannot see the fly from the bottom. From the bridge it is an immense rapid for at least a quarter of a mile. The pools where I caught my grayling nine years ago were parts of the great rapid."

The following little poem, descriptive of the Traun in its power, was written about this time:—

"ON THE FALL OF THE TRAUN.

"July 25, 1827.

"From the high rock thy lovely waters burst,  
 As if a new creation from the wand  
 Of Israel's mighty prophet, sprung to life  
 To save his people! But the dreamy thought  
 Of that most blessed, tho' but scanty rill,  
 Gives but faint image of thy might, and power,  
 And awful force, and fulness: as if a spirit  
 Imprison'd by magic art and now released,  
 Thou thunderest on, determined to destroy;  
 And thy mild functions to produce and cheer  
 Are changed for attributes more terrible,  
 Saddening, destructive, wildly carrying on  
 Rocks, trees, before thee, e'en the mighty pine,  
 Rending the mountain, through a new-torn vale,  
 Opening thyself a passage to the plain.  
 But in thy wayward and most perilous leaps  
 Thou still art pure, and still might image well  
 The innate mind of poet or of sage.  
 In thy bright azure depths, and when thy foam  
 Sinks into quietness, I seem to view  
 That season of our life when pleasure fades,  
 And sober reason with its heavenly light  
 Fills the deep cool of th' unimpassion'd mind,  
 Escaped from turbulent and fretful youth,



Its troubles, passions, bubbles, noise, and foam,  
 Which are well imaged in the falling stream.  
 E'en as I look upon thy mighty flood,  
 Absorb'd in thought, it seems that I become  
 A part of thee, and in thy thundering waves  
 My thoughts are lost, and pass to future time,  
 Seeking the infinite, and rolling on  
 Towards the sea eternal and unbounded  
 Of the all-powerful, omnipresent mind!"

\* \* \* \* \*

"*June* 18.—Rain all night. Thermometer 65° in room and in window. Went to the Traun, and fished below the bridge and at the mill. Had very good sport; a day with occasional clouds and rain, and gleams of warm sunshine. Hooked above the mill a very large trout, I think above four pounds, who got under a bank, and broke my fine *gut*, after some good play. Caught seven lache forelle, or lake trout, and they call them here see-forelle, with green backs, black spots only, and belly of a beautiful silvery whiteness.

|                |   |   |   |   |          |
|----------------|---|---|---|---|----------|
| " Pectoral fin | . | . | . | . | 13       |
| Dorsal         | . | . | . | . | 12       |
| Anal           | . | . | . | . | 12       |
| Ventral        | . | . | . | . | 9        |
| Caudal         | . | . | . | . | 20 or 22 |

"The largest of these fishes about three quarters of a pound. Caught two common trout, very silvery, but with red spots; and two large grayling, one nearly two pounds.

"I have seen few finer fishing incidents than the one of this day. The large trout, who was lying off the edge of the foam of the fall, rose at the fly, and was slightly hooked only. I changed the fly, and put on a

larger one, and he took immediately, and dashed away into the rapid water, when he sprung high in the air. He then went to the bottom, and I unwisely suffered him to run, supposing he would go down the fall; instead of which he ran to the bank, and there felt his strength, and broke a slender stretching line. Went at ten, returned at three.

\* \* \* \* \*

“22d. *Voglabrück*. — A great thunder-storm in the night, and the rain continues. Thermometer 88°.

“Went to the source of the Agger, that is, where it is poured out by the Kammer-see, a fine sapphire (pale blue) stream, full of grayling. Whilst a thunder-storm was brewing and falling, I caught a vast many grayling; beautiful fish, with yellow bellies and sides, some a pound and a half. I caught so many that I cannot count them.

\* \* \* \* \*

“24th.—A fresh, beautiful morning; came on to Kammer, and fished till half past two from eleven. Had excellent sport; caught a number of great grayling, from one to two pounds. Caught one trout likewise. The Agger is beautifully clear and blue, and it is impossible to have finer fly-fishing; but it is almost satiating from its perfection, and from there being no difficulty of any kind, except what arises from my state of health.

“25th.—At six in my window 55°: a beautiful day. At three, thermometer in room 64°. Returned from a loitering day, in which I caught some grayling and a large bleak, almost as large as a herring; but fished without much energy, and chiefly experimentally, with salmon and large lake flies, with which I caught grayling. The Agger, I think, somewhat smaller, but now

four times as large as the Avon, and amongst the clearest streams I ever saw ; as clear as the Lathkill or Traun.

“Went out again at six : a beautiful evening for fishing ; calm ; had excellent sport : caught ten or twelve great graylings, from two pounds to one pound, which I saw rise at the fly.

26th.—Found a fire-fly in my room last night. Thermometer at half-past seven in room  $60^{\circ}$ , in window  $59^{\circ}$ . Left Kammer for Mond-see, a journey commanding beautiful views of the Kammer-see, for four or five miles along its banks ; and after an inland journey of seven or eight miles, the road opens on Mond-see, which is likewise a beautiful lake.

“27th. *Mond-see*.—Thermometer in window at nine,  $58^{\circ}$  ; cloudy, and a fresh-feeling day. It turned out a rainy morning. I went, however, to the river, and caught, principally with the May-fly, a number of small trouts, I should think forty, and four large grayling.

“A beautiful evening ; the mountains illuminated above the lake by an unseen sun, and the western sky in a blaze of vermillion ; light so bright succeeded by almost absolute darkness. My evening walk was to the hill above the town, from which the views are very beautiful.”

\* \* \* \* \*

“Virtue in its influence on life, from its beginning to its end, may be compared to the full moon, guiding the pilgrim in his nightly journey, and pointing, in setting in the west, to the brighter and more certain guide, the sun, rising in the east from which her light was but a faint reflection.” He adds, “This was a thought of



early youth, thirty-two years ago, when I was eighteen, and versified then in annual Anthology, 1799.”

\* \* \* \* \*

From Salzburgh, where he went on the 30th, and remained part of the following day, he wrote a letter to Mr. Gilbert, part of which I shall insert, as it is descriptive of his state of health at that time ; of the tempered manner in which he indulged the hope of recovery ; his feelings towards the Royal Society and the cause of science ; and of his motives for retiring from the office of President.

\* \* \* \* \*

“I am sorry to say that the expectations of my physicians of a complete and rapid recovery have not been realized. I have gained strength, under the most favourable circumstances, very slowly ; and though I have had no new attack, and have regained to a certain extent the use of my limbs, yet the tendency of the system to accumulate blood in the head still continues, and I am obliged to counteract it by a most rigid vegetable diet, and by frequent bleedings with leeches and blisterings, which of course keep me very low. From my youth up to last year, I had suffered more or less from a slight hemorrhoidal affection ; and the fulness of the vessels, there only a slight inconvenience, becomes a serious and dangerous evil in the head, to which it seems to have been transferred. I am far from despairing of an ultimate recovery ; but it must be a work of time, and the vessels which have been over-distended only very slowly regain their former dimensions and tone ; and for my recovery, not only diet, and regimen, and physical discipline, but a freedom from anxiety, and from all business and all intellectual exertion, is absolutely required.

“Under these circumstances, I feel it would be highly imprudent, and perhaps fatal for me to return, and to attempt to perform the official duties of President of the Royal Society; and as I had no other feeling for that high and honourable situation except the hope of being useful to society, so I would not keep it a moment without the security of being able to devote myself to the labour and attention it demands. I beg, therefore, you will be so good as to communicate my resignation to the Council and to the Society, at their first meeting in November after the long vacation, stating the circumstances of my severe and long continued illness as the cause. At the same time, I beg you will express to them how truly grateful I feel for the high honour they have done me, in placing me in the chair for so many successive years. Assure them that I shall always take the same interest in the progress of the grand objects of the Society, and throughout the whole of my life endeavour to contribute to their advancement, and to the prosperity of the body.

“Should circumstances prevent me from sending, or you from receiving, any other communication from me before the autumn (for nothing is more uncertain than the post in Austria, as they take time to read the letters), I hope this, which I shall go to Bavaria to send, will reach you safe, and will be sufficient to settle the affair of resignation.

“It was my intention to have said nothing on the subject of my successor. I will support, by all the means in my power, the person that the leading members of the Society shall place in the chair; but I cannot resist an expression of satisfaction in the hope you held out, that an illustrious friend of the Society,—illustrious from his talents, his former situation, and I

may say, his late conduct,—is likely to be my successor.

“I wish my name to be in the next council, as I shall certainly return, *Deo volente*, before the end of the session, and I may I think be of use; and likewise because I hope it may be clearly understood that my feelings for the Society are as they always were,—those of warm attachment and respect.”

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“*July 4.*—Rain and lightning all night, and still continues at eight. Thermometer fallen to 62° in window. Left Transtein on the Munich road; the Chiem-see and small lakes form beautiful pictures in the landscape: the Chiem-see bounded by high mountains, and surrounded by woods. Rained till one o’clock, and then were fine views of the mountains, with clouded intervals. Reached Aibling at four o’clock.

“*7th.*—Cool in the morning at eight. Thermometer 62° in window. Shall leave Munich for Starenberg on the lake. The journey to Starenberg not interesting, through large woods. Lake too low, and mountains too desolate.

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“*8th.*—Went to a small lake, Kochl-see, about six miles off. The scenery I think finer than any I have yet seen in Bavaria, except perhaps the Chiem-see. In returning caught some small trouts in a brook we crossed. The fisherman says there are huchos both in the lake and the large river which feeds it.

“*9th.*—Came on to Feussen; the road picturesque, especially the last eight or ten miles. Went to the fall of the Lech, a large river, tinted from melting snow.



The fall not high, but the scenery surrounding it fine.  
 Thermometer at six in window  $65^{\circ}$ .

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“11th.—Constant sunshine without a cloud. Came on to Bregenz. The views in descending to the town fine, and the mountains of the Tyrol and Appenzal very grand seen over the lake. Hot in the sun, in shade  $76^{\circ}$ ; and the thermometer, even in the night, above  $70^{\circ}$ .

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“12th.—Shall set out for Constance. Promise of a cloudy day. Thermometer  $70^{\circ}$  at seven. Passed the Rhine, a large turbid stream; rich country, abundance of vineyards, but nothing picturesque along the bank of the lake. Constance little worth seeing. The Rhine a grand river where it joins the two lakes. Went in a boat and fished, but saw nothing.

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“14th.—In the morning came on to Schaffhausen: bright sunshine, but not very hot. Thermometer in small room here  $69^{\circ}$  at half past two. Went in the evening to the fall of the Rhine, which was very grand,—fuller of water than when I was here twelve years ago. The rainbow beautiful. Fished in vain; but saw some men fishing, who took hase, carp, and chub. Did not see a fish of any size or interest rise, nor in the Rhine above the town. The fall, I think, may compare with that of the Gotha for size and effect; it is twice or thrice as large as that of the Traun, and I think about half the size of that of the Glommen. It is inferior to this last fall in height as well as in greatness, but its accompaniments and the colour of the water are much finer. I went down by the left bank, but the view is finer from the opposite side.

“The eels in the Lake of Constance must climb the fall, which I have no doubt they do, by wet moss and grass on the sides of the rocks. A *subterranean fall*, like that of the Rhone, they cannot climb. At Ballyshannon I have seen them in their progress; millions die, but millions likewise ascend.

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“15th.—Arrived at Zurich at one. The Limmat is beautifully clear, like the Agger in tint and size. Nothing worth seeing in the road from Schaffhausen here.

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“17th.—*Wesen, Wallenstadt Lake*.—A beautiful travelling day. The bottom of the lake very fine. The scenery in a dark but red sunset very sublime. This lake far the most magnificent I have seen in this journey.

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“18th. — *Wesen*. — A rainy night and morning. Thermometer at 64° in room. Notwithstanding the rain, the views up the lake fine; the clouds passing over the dark rock and pine. This lake has more the character of a Styrian lake than any I have seen in Switzerland, and is like the Traun-see; but the river is not like the Traun: it is a whitish stream, and I have seen no fish in it.

\* \* \* \* \*

“Went to Glarus. The scenery upon a grand scale, with rocks extremely high, capped with snow. Like the scenery of Eisenharz in Styria, but I think upon a grander scale. Another beautiful sunset, with dark clouds hanging on the mountains, and the tops, clouds, and snow tinted with red or yellow light.

“19th.—*Ragas on the Rhine*.—The road to Ragas very good and picturesque. The mountains peaked, and spotted with snow. The views here of the same character, very *Styrian* like; and the Rhine resembling the Einers.

“20th.—A bright morning; at five thermometer in room 60°. The peaks of the near mountains in bright sunshine. Passed the Rhine, and came on to Felknis and to Bludenz. The scenery beautiful; high mountains in some places display patches of snow; clear waters; and the Inn, a wild foaming torrent, clear but white: the peculiar, high-wooded mountains of the Tyrol in perfection.”

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“21st.—*Landeck, in the junction of the Rosana and the Inn*.—Arrived here from Bludenz at a little after five. The day was cloudy, and the latter part wet. I have never, I think, seen a finer road, or more romantic scenery. The sources of the Inn, beautifully clear, are visible all the first part of the road, and you soon ascend from the first post station to the snows, &c., which send down clear blue streams to the Inn. I never saw a finer effect than that produced by the wind and clouds, when we had passed the summit. It was like a rapid shifting of the most brilliant scenes; snowy capped summits shone forth in sunshine, and then were hid by a white cloud. Bright woods and the gushing cataract all came, as it were, living and moving upon the eye; the clouds sometimes seemed to fall like stones, and then to rise like balloons. These extraordinary phenomena ended in a thunder-storm and rain; but even in the rain the scenery was very fine. The stream from the mountains nearly loses its clearness by foul com-



panions, before it joins the Inn, which is like washer-woman's lees. Thermometer here  $62\frac{1}{2}^{\circ}$ .

"A fine sunset after the rain. Went after dinner along the magnificent road which goes to Balsano. The views very striking: high mountains, with the tops covered with new-fallen snow; the road above the Inn. The postmaster says there are grayling in the Inn, and trout in the Rosana. These roads do great credit to the Austrian administration.

"22nd.—Arrived at Nasserëit a little after twelve. The road of the same imposing and sublime character. Mountains on each side capped with snow and breasted with clouds. Tempted by the appearance of a clear stream to stop here. Went at five o'clock to a small lake, the lowest of the three, which I remarked for the peculiar colour of the water twelve years and a half ago; it was of a bright grass green, though I think less green than at that time, as the pine wood is decayed and worked out. Saw no fish rise but just at the rapid, where the small river enters; saw a fish follow my fly from the rapid into the still water, where he took it. It was a char in good season of half a pound. Caught another fish, a small trout, in the little lake above, which was clear, but slightly milky; but fished in vain in the same place. This is the first char I have ever taken in angling. Thermometer in room  $66^{\circ}$  at nine; in window  $63^{\circ}$ .

\* \* \* \* \*

"23rd.—Arrived at Inspruck at three o'clock. The scenery in this part of the road not so fine as yesterday's. The valley of the Inn broader, and bounded by high mountains spotted with snow; a fine calm and bold outline; the valley very green; the Inn white and turbid. The rain is over; it is a close dark evening,

rather oppressive to the feelings. The walks here fine, with the views of the snow-spotted mountains immediately above the town. Thermometer  $63^{\circ}$  in the room; at  $60^{\circ}$  in the window at nine.

“26th.—*Steinach two posts from Inspruck*.—Arrived at twelve. Dined on ptarmagan, which was excellent. Slept here: the scenery very fine; deep valleys, with a foaming torrent white from snow, and high mountains covered with snow in the distance; one entirely covered.

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“31st.—*Sillian*.—The course of the Drave is so changed by the winter floods, that it appears another river, and the fish seem to be all washed away. I have fished in all the places that seemed good, and have caught nothing.

“This place is in Puster Thal, which finishes at Lienz and begins at Brixen; and is certainly one of the grandest valleys in Europe.

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“*August 1. — Greifenburg*.—The scenery between Lienz and this place very beautiful; high mountains; apparently limestone, rising above the Drave; and extremely lofty spruce firs on the left bank; the view from Greifenburg *very* beautiful; a pyramid of rock opposite, with snow in its crevices. Thermometer in closed room here  $72^{\circ}$ ; in window  $80^{\circ}$ .

“It is, I think, the hottest day I have felt; but I have confined myself to the room, with windows and jealousies closed.

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“3rd.—Came to Wurzen. Arrived at twelve. A beautiful day, and the views from Vallach along this high mountain-road very glorious. The clouds of the

whitest tints, lighted up by the orient sun, filled the valleys of the Gurlen and Drave, and the mountains rose above them into the bright blue sky. The road is through forests of beech trees and spruce firs, and the mountains on the Italian side occasionally appear crested with snow in ascending: but it is in descending that these mountains open upon the view in their greatness. They present the noblest forms calcareous rocks can assume, and a great variety of colours; and they rise above beautiful green valleys (and high-wooded mountains), breasted with snow, and presenting their inaccessible summits to half the sky. I know no scene more sublime than this crest of the Carnean or Noric Alps; and there are no streams more beautiful than the two that originate from it,—The Sava and the Isonzo. Temperature about  $70^{\circ}$  in mid-day, but not oppressive to the feelings.

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“5th. — *Villach*. — Returned after a ride to a lake about two hours off. The road to the lakes below the Manhart (there are two) is very dangerous, but very picturesque; and I have seldom seen a scene of more savage and peculiar wildness. The lake is a clear blue shallow water, a sapphire set in silver, for the mountains are white; and the lake is called Weissanfels. Saw some trout in the lake, and minnows; the *trout* would not take the fly. In returning, the dog found some quails, and I shot three. Thermometer at two  $70^{\circ}$ . Went to the marsh, but found no ducks.

“There was a beautiful rainbow at seven, and yet, August 6, it rained and thundered all night, and is still raining. At seven the thermometer  $62^{\circ}$ . Came on to Crainburgh; it rained all day, with more thunder and lightning. Here, in window, thermometer is  $66^{\circ}$ ; and



there is another evening rainbow. Does the proverb only apply to England?

“The scenery in the upper part of the valley of the Kraimer Save is very beautiful; dark rock, with large masses of snow in all the hollows, and fine wooded hills below.

“*Since the rainbow* appeared, it has lightened and thundered, and rained, almost without intermission. The thermometer now, at eight o'clock, is below 60° in the west window.”

On the 7th of August he arrived at Laybach, and on the 18th he decided on leaving it, in consequence of two or three attacks of a bilious kind which he experienced. He thus notices the most severe, which occurred on the 13th:—

“A bilious attack came on last night, and has left me extremely weak, with a pulse at 110, which I have not had for many months. I feel extremely ill, and doubt if I shall recover. I feel as if my heart was affected. Is not this bilious attack generis *Rafflesii*?”

On the 15th he writes,—

“The night and the day are alike cloudless: and if in health and spirits, I should enjoy these glorious mountains; but I have a furred tongue, and a pulse at 96.° I have applied a blister to the nape of my neck, and leeches to the temple. I know not what my fate will be; but yesterday I was particularly abstemious, and to-day I shall scarcely eat anything except broth.”

On the 18th he thus writes from Assling:—

“Resolved to leave Laybach; pulse 85° or 86°, and extremely weak; slept ill,—and at seven set out for Assling. Have never felt so ill since I began my journey.” He adds,—“I must change the system; for

I feel I cannot bear this exhausting plan, and if I continue it I shall die of debility." He continues:—"At five, pulse rather mended,—80°; and the journey seems to have done me so far good. I admired, though we had thunder and a violent storm, the magnificence of the valley of the Save, which was this day in great beauty."

I shall insert a few more extracts from his journal of his homeward journey, which, like the preceding, may help to show in part how he passed his time, the fluctuating state of his health, and his unceasing enjoyment of the beauties of nature.

"19th.—Arrived at Wurzen. A bright sunny day and very warm. Thermometer at twelve in room 66°; out of doors 76°, and moist one 66°: appearances of tongue and pulse improve; pulse only 72° to 78°.

"The Save, notwithstanding the storm of yesterday, was beautifully clear, and the colour of Scotch topaz, that is, bluer than sea-green. The mountains are in great beauty: on the highest peak, which was almost covered with snow, black narrow clouds were rising, as if from a volcano, and in the sunshine becoming first white and then melting away. I think this valley, from Laybach to Wurzen, the most beautiful I have seen in Europe.

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"21st.—*Wurzen*.—It was a delightful breezy morning, with clouds; I went out on horseback, and beat some fields, and enjoyed the mountain view, and felt grateful to the O. E. I. for the improvement in my health. Rode till one, and shot tolerably; three rails, and two quails. The mountains were in great beauty. My pulse after my ride and exercise this morning only 72°, and my tongue cleaner than I have seen it for a

long time. Took a ride at six to the opening of the glen below where another stream joins the Sava; a glorious valley. Fished before without any success in the lake and river; there was no fly on, and a distant thunder-storm kept down the fish. Pulse at nine this evening 62°.—G. D. O.

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“27th.—Went after dinner in the boat round the top of the lake, but I did not find a single duck. Admired the Sorgente Sava; a number of deep circular holes with air bubbling through them, and large jets of water, which is beautifully clear. It seems to rise through mud; but there is no appearance of sand, and no turbidness. No plants grow in this place; and there are no fish near it.

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“30th.—Examined this evening the air disengaged in such large quantities where the Sava rises. It appeared to me to possess all the characters of *common air*; was not absorbable by water, and supported flame in the same manner as common air.

“31st.—A wet morning. Resolved to pursue my journey to Baden, as my spirits cannot bear this constant solitude, where there is no amusement and no books. Pulse not worse; 70°.

“Sept. 2nd.—*Grieffenburg*.—These three thoughts occurred to me last night:—

“1. The river, like human life, has its origin from *infinity* (that of air), and is lost in immensity (that of ocean.)

“2. May not all the phenomena of life be the results of single organization, that is, may not the organization of the two first beings have produced all the phenomena, moral and physical, belonging to their infinity of



descendants all dependent upon one law, without any interference afterwards?

“3. The Dutch burgomaster, whose ideas were so limited that in a time of a famine he proposed to prevent a future one, by converting a part of the park at Amsterdam into a potato garden.

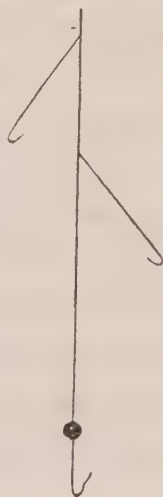
“Came on to Lienz. The clouds disappeared about one o’clock, and I never saw a more beautiful evening; the zodiacal light was quite brilliant, and the mountains all uncovered. The scenery about this place rivals that of Wurzen.

“Went out in the carriage, and had excellent sport; shot well all day; missed only the first shot, which was too far off; and afterwards shot three rails, eight quails, and one snipe. I took my exercise well, with less fatigue, and certainly feel better. Offered up my thanksgivings to the O. O. O., with tears of gratitude and feelings of intense adoration.

\* \* \* \* \*

“Sept. 4.—A beautiful evening, with a full moon, and the mountains lighted by a gorgeous setting sun. Took a long walk, and my pulse on my return was not more than 71° or 72°. Saw this morning, in my walk, boys fishing in the Ischl; one had a grasshopper on the bottom hook, with lead above, and two artificial flies two feet and three feet above the lead, on coarse hair link. He had taken a small grayling. Thermometer at half past seven in window 50°. Thermometer twenty minutes before nine in window 50°. A bright and beautiful night. The Ischl is rolling a flood of light under the full moon, and the snows are distinct on the mountains in the moonbeams.

\* \* \* \* \*



“9th.—At Brenner, where I came this evening, the thermometer in the room was only  $53^{\circ}$ , and in the window  $44^{\circ}$ . I was only two hours in the morning in coming from Sterzing to Brenner. The scenery struck me as very fine, and more than when I saw it last in going down; more, I think, than in any of my former journeys, and this is my fourth time of passing it. The views on the snowy mountains on the right hand going up are very grand, and the distances well preserved; that is, a succession of mountains, which appear very distinctly one behind the other, with rocks, with pine woods, and in the back of all the snowy peaks.

\* \* \* \* \*

“11th.—Arrived at Nassereit at four o'clock. The scenery appeared to be grander in coming up than going down. At five o'clock the thermometer outside of the window is  $72^{\circ}$ , and the moist one only  $55^{\circ}$ . The autumnal migration of birds seems more dependent upon the want of food than upon temperature. The quails remain till all the food is taken off the ground. But in Italy, as many as can feed in the stubbles stay all the year; and in Ireland, I doubt if they ever migrate to the Continent. The landrail, which feeds on worms and flies, certainly does. A curious subject is the connection of the habits of birds with the growth of particular plants. The quail seems to fix his abode where he finds *small* seeds; the rail in moist meadows, where snails, grasshoppers, and other flies and worms abound, and he eats with them the seeds of grasses.

\* \* \* \* \*

“13th.—Left Nassareit for Reitte, a magnificent road, with the little lakes sparkling like emeralds in their pine-covered basins; but the waters in all of them appear this day equally green, and many fish were

sporting in them. Bought a female gelinotte and a ptarmagan: the foot of the gelinotte is curious, from the scales and protuberances which occupy the place of feathers, and which must be almost as bad conductors of heat; at the same time, they are better fitted for a bird that lives principally in thick woods, and perches on small branches, as they give prehensile power to the feet.

\* \* \* \* \*

“14th.—The scenery round Reitte fine, and the pass through the mountains to Füssen a grand Alpine valley. The woods are now in great beauty; their autumnal tints developing; and the Lech is of a clouded blue, and much clearer than in July. From Füssen to Kempten little worth seeing. We passed the Weissen-see, a lake in which it is said the mirror carp is found. This lake is not large, and there is nothing interesting in the views to a tourist coming from the valleys of the Drave, Save, Inn, and Salza.

\* \* \* \* \*

“15th.—Came to Ulm. The only thing worth notice on the road was the quantity of hops round Menningen, which appeared to me higher than any I have seen: some of the poles, with hops rising to their summits, twenty feet high. The Danube is clear; and I saw some fish, I suppose coarse ones, rise in it. The environs of Ulm I think rather pretty, with gardens rising above the walls.

\* \* \* \* \*

18th. *Plochingen*.—A bright morning. I intend to go back to my *grayling fishing*, which I might have enjoyed in coming down, had I trusted my eyes, and not what was said. Fished at Guitenger, in the water above the town. The scenery is very pretty; rocks and



woods, and a wild narrow glen, with a small trout-stream about the size of the Chenis water. There are few grayling; none above the town in this water, the Rosach; they are principally found in the Vils, a mile lower down. I caught in an evening's fishing, between four and six o'clock, I dare say from forty to sixty fish; none of them above three quarters from that to a quarter of a pound; many ten inches or eleven inches long: all trout.

"I do not know when I have felt more my paralytic symptoms, whether owing to more exercise, or to some other cause; but I feel as if a ligature was bound along the course of the arm and thigh. Perhaps I have walked more continuously than in shooting.

"19th.—A fresh morning; some light clouds. It is my intention this morning to try for grayling in the Vils. Left Guitenger, and stopped with the carriage at Allenstadt, where the Vils joins the Rosach, a stream like the Teme in summer, and containing close to the town plenty of grayling and trout. I took the fisherman with me, and soon filled a *fish barrel*, and threw in numbers. I dare say, that in three pools, in less than an hour, I caught fifty fish, nearly an equal number of grayling and trout, but none much more than half a pound, like the last year's grayling of the Teme. They rose at a dark fly, and I took them *all* with one fly.

"It became cloudy whilst I was fishing, though it was bright till ten minutes before I left off, and it gradually became darker after twelve o'clock, and at three ended in a thunder-storm, and the rain accompanied me to Stutgard at half past four. The Necker was muddy; ere I passed by, its clear tint became red. Vine cultivation, and Indian corn, and rather pretty hills along the road; but the finest part is about Geislenger.

There the trout and the grayling stream, and the wild rocks, give an interest to the scene, even to one who is not an angler.

\* \* \* \* \*

“21st.—A bright fine morning at Carlsruhe. Passed a disagreeable night, with symptoms of indigestion so violent that I feared at first they were apoplectic. I regret the quiet and beauty of the Tyrol and the Illyrian provinces; and if I had medical advice, would return to them immediately. These inns and people seem made to *form* invalids. I had two peasants swearing, and smoking, and snoring, in the next room to mine, who scarcely allowed me to sleep, and woke me before daylight.”

\* \* \* \* \*

“22d. *Baden*.—A fine day; but whether loitering disagrees with me, or from what other cause, I am, *valde miserabilis*, worse as to sensations than since I have left Laybach. The scenery in the beginning of its autumnal tints is very beautiful, and for a person well or becoming convalescent it would be a beautiful place, and an agreeable residence: but I fear my light of life is burnt out, and that there remains nothing but stink, and smoke, and dying snuff.

\* \* \* \* \*

“25th. *Spiers*.—Decidedly worse; applied sixteen leeches and a blister to the nape of the neck. Decidedly worse, and have decided to go home immediately;—the old pain, and more severe in the region of the heart; yet I ate yesterday only the breast of a partridge, with a little pike; to-day have eaten only a little chicken broth, and shall fast for two or three days; pulse nearly 100.

“27th. *St. Goar*.—A very beautiful and glorious

evening. I thought I was going to be quite well, as the weakness of the left wrist, which put an end to my shooting at Spiers, is quite gone; but I found my stiff leg as bad as ever. Yet I can hardly be lower, or live lower.—*Dubito fortissime restaurationem meum.*

“As I have so often alluded to the possibility of my dying suddenly, I think it right to mention that I am too intense a believer in the Supreme Intelligence, and have too strong a faith in the optimism of the system of the universe, ever to accelerate my dissolution. The laurel water, therefore, which I have carried about with me, and used constantly, and from which I have decidedly derived benefit, is a prescription of Tomasini’s; and the laudanum and opium which are in my dressing-case, but which *I have never used*, were recommended to me in small doses to remove irritation, taken with purgatives. I have been, and am, taking a care of my health which I fear it is not worth; but which, hoping it may please Providence to preserve me for wise purposes, I think it my *duty*.—G. O. O. O.

\* \* \* \* \*

“Walked for an hour this evening in the moonlight; probably, with constant use, my leg and arm will be restored. I think I decidedly gain ground.”

In this precarious state of health, and often wretched state of feeling connected with it, he pursued his journey to England, where he landed the 6th of October. That night he slept at Canterbury, on his way from Dover to London, and the following day he arrived at his house in Park Street.

He remained in England till the last week of the following March; and, in relation to health, was neither better decidedly nor worse. He continued in the same fluctuating state, occasionally indulging in sanguine



hope of recovery, and most willingly trying new modes of treatment; occasionally almost in despair of amendment, yet still struggling on, and making head manfully against his infirmities. Unable to enter into London society, or follow actively the pursuits of science, he proposed soon after his return taking up his residence in the country, and he probably would have done so, could he have found at that time a place to be sold or let which accorded with his views as to climate, and scenery, and field and river sports. Whilst in quest of such a spot, he paid two visits, the only ones he made during his stay in England; one to a nobleman in Sussex, for whom he had a great regard, at whose house he was taken ill the preceding year; the other in Somersetshire, to his old and respected and much-loved friend Mr. Poole, with whom in November and December he spent about six weeks, with as much pleasure as he was capable of enjoying.

His occupations and amusements, at all periods of his life, were nearly identical, and so they were now. We have seen with what zeal he followed shooting and fishing on the Continent, whenever circumstances admitted of his engaging in either, and how deeply he was interested in several branches of natural history. At this season, when the angler's rod was useless, and he found himself hardly equal to the exertion which shooting requires, he sought refuge from ennui in composing his little work on angling, called "*Salmonia*," or "*Days of Fly-fishing*," written somewhat on the plan of his favourite author, Isaac Walton's "*Complete Angler*," or "*Contemplative Man's Recreation*;" in the form of dialogue, and discursive.

The extracts already given from his journals of travels will afford some idea of his fitness for the undertaking,

and of the amusement which he might derive from the recalling of old scenes of enjoyment, and the memory of pleasures passed away. From his boyhood, we have seen, he had been a lover of the angle, and he was hardly less fond of fowling, for which sport also he had acquired a taste early in life. At no time of his life did he relinquish angling, except at the commencement of his public career, whilst he was at Clifton, and the first year or two he was in London, when all his faculties were strained in the pursuits of science under the impulse of a lofty ambition, and an intense desire of distinguishing himself, extending the boundaries of human knowledge, and benefiting mankind. When he resumed angling, he pursued it, I may say, passionately for some years, and never used his gun. The time, however, arrived, I think it was soon after his marriage, that he seemed to prefer his gun to his rod; and probably the reason for this was that he was much in the country in the autumn, and followed fishing and shooting more than formerly for amusement, and less as a mere relaxation from his scientific labours. Latterly, it is difficult to say which he preferred; the preference, I believe, was very much decided by the *kind* of sport; the *salmo hucho* of the branches of the Danube, in Southern Austria, and the double snipe in the marshes of Rome and Ravenna, Laybach and Altona, would be to him almost equally attractive. By connecting both sports with natural history, he gave them a degree of importance and interest not their own, and made them, as it were, rational. His note books show this very remarkably; they contain not merely the minutes of his day's sport, but also the results of his observations for the purposes of distinguishing species and identifying them, and of ascertaining their routes in migration, their

peculiar diets and habits, of which an imperfect notion only can be obtained from the extracts brought forward. He was a better angler than he was a fowler; indeed, he was the most successful angler I ever knew. He threw the fly with great delicacy and dexterity, and had a tact and knowledge which made him very superior to the common angler, however much practised. Salmon fishing he was very successful in; but, I believe, he was most successful in trout fishing, in which he had most experience. His tackle was curious and elaborate; he seems to have had a pleasure in collecting the gay materials necessary for dressing flies, though he seldom used them himself, excepting on emergency, having been always too much occupied to have had leisure to apply himself much to fly-making, an art in which it is impossible to attain tolerable skill without much practice.

I am sorry I have not a portrait of him in his best days in his angler's attire. It was not unoriginal, and considerably picturesque — a white low-crowned hat with a broad brim; its under surface green, as a protection from the sun, garnished, after a few hours' fishing, with various flies of which trial had been made, as was usually the case; a jacket either grey or green, single-breasted, furnished with numerous large and small pockets for holding his angling gear; high boots, water-proof, for wading, or more commonly laced shoes; and breeches and gaiters, with caps to the knees made of old hat, for the purpose of defence in kneeling by the river side, when he wished to approach near without being seen by the fish: such was his attire, with rod in hand, and pannier on back, if not followed by a servant, as he commonly was, carrying the latter, and a landing net. In fishing, as well as in every thing



else which he undertook, he displayed extraordinary zeal and energy. It was not unusual for him to go two or three hundred miles for a day's fishing, and his perseverance was in the same proportion. I remember fishing with him from early dawn to twilight in the river Awe in June, for salmon, with little interruption, without raising a fish. Passionately fond of the beauties of nature, which he felt as a poet and saw as a philosopher, probably the happiest hours of his life were spent by the river or lake side, or on the mountain moor. In the open air, in the country, at any season of the year, but more especially in spring and autumn, when in tolerable health, he could always (and sometimes even when labouring under disease,) throw off his cares, and rid his mind of all annoying thoughts. There he recovered the hilarity natural to his disposition, and appeared in his true character, most cheerful, amiable, and entertaining, and the delight of his friends. They, indeed, I will now say, were almost his only true friends who were his associates in these sports; and they perhaps were almost the only persons who knew him thoroughly and truly. But it is time to quit this digression, and return to the subject which led me into it,—“*Salmonia, or Days of Fly Fishing.*” Perhaps, never was a work more characteristic of the mind and pursuits of its author; in fact, it is little more than the most interesting parts of his journal dramatised, on the foundation of his general experience in angling and the sports of the field, and his researches in natural history and science, diversified and enriched by thoughts and reflections rising from nature to nature's God,—from the beauties and admirable contrivances of creation to the wisdom and goodness of the Creator.

I am approaching the end of my task, and it is now a

sad one ; for I have to record my brother's last journey and the close of his life.

Not finding his health improve materially or permanently at home, he decided, with the consent of his physicians, on quitting England for his favourite Alpine regions in Southern Austria. There he proposed to spend the summer, and in the winter to descend into Italy. "I was desirous," he says, in his 'Consolations in Travel,' "of again passing some time in these scenes, in the hope of re-establishing a broken constitution ; and though this hope was a feeble one, yet, at least, I expected to spend a few of the last days of life more tranquilly and more agreeably than in the metropolis of my own country. Nature," he adds, in a strain of melancholy sentiment and high admiration, "Nature never deceives us. The rocks, the mountains, the streams, always speak the same language. A shower of snow may hide the verdant woods in spring ; a thunder storm may render the blue limpid streams foul and turbulent : but these effects are rare and transient ; in a few hours, or at least days, all the sources of beauty are renovated ; and Nature affords no continued trains of misfortunes and miseries, such as depend upon the constitution of humanity,—no hopes for ever blighted in the bud,—no beings full of life, beauty, and promise, taken from us in the prime of youth. Her fruits are all balmy, bright, and sweet ; she affords none of those blighted ones so common in the life of man, and so like the fabled apples of the Dead Sea,—fresh and beautiful to the sight, but, when tasted, full of bitterness and ashes."

He set out from London on the 29th of March, accompanied by Mr. Tobin (now Dr. Tobin), the eldest son of his early friend, Mr. James Tobin, a young gen-

tleman who had nearly completed his medical studies. Passing through Austrian Flanders, they crossed from the Rhine to the Danube ; and from thence at Donauworth, proceeding southward, the season not being sufficiently advanced to enjoy the Alpine country, they travelled without much delay to Laybach, where they arrived on the 4th of May.

At Laybach, for a little while, he amused himself with fishing and shooting, and extending his observations on natural history. The petzardone was then in the marshes, and the hucho in the rivers. In the stomach of the former, in many instances, he found a peculiar caterpillar, that of the *Eporris cincta* of Borelli, which he believed might be the proper food of this bird, and partly the object of its migration ; and about the gills of many of the huchos which he caught he observed many leeches. This he connected with a general remark, which is entered in his note-book, that “almost all the salmones, before and at the time of their migrations, are troubled with parasitic animals.” He continues—“Are not these the cause of their migration? Yet why?—Those gained in warm water are destroyed by cold water ; those gained in the sea are destroyed by fresh water.”

On the 18th of May he quitted Laybach, on his way back to his “old haunts,” an expression of his own, which he uses in an entry in his journal of the 22nd, prefixed to an animated though brief description of scenery. “22nd.—To my old haunt, Wurzen, which is sublime in the majesty of Alpine grandeur ; the snowy peaks of the Noric Alps rising above thunder clouds, whilst spring in all its bloom and beauty blooms below ; its buds and blossoms adorning the face of nature under a frowning canopy of dark clouds, like some Judith



beauty of Italy,—a Transteverene brow and eye, and a mouth of Venus and the *Graces*.”

Here he spent a few days. On the 24th he went to Raibl and to the Fletzbach brooks, intending, as he says in his journal, “to have gone to the source of the Isonzo, but was shown by a misinformed person three or four torrents, feeders of this river, in a glen as wild as any thing I have ever seen.” He adds,—“The lake of Raibl very fine; perhaps as sublime, amidst fine woods, and perpendicular rocks, and snowy mountains, as any scene in Switzerland.”

Proceeding towards Ischl, he spent about a week in the beginning of June at Aussee. From thence I had the satisfaction of receiving from him the following letter:—

“ Aussee in Styria, June 3, 1828.

“ MY DEAR JOHN,

“I hoped to have found a letter from you at Ratisbon, but I was disappointed. Indeed, from the experience of last year, I almost despair of any regular correspondence between us, whilst we are both in foreign countries. Notwithstanding the long, severe, and depressing malady under which I still labour, I am not entirely without the hope of ultimate recovery, and the few pleasures that I retain in this my state of earthly purgatory have principally reference to the enjoyments and prospects of my friends; and I indulge in the idea that you are well and happy, and *enjoying* a life, which I can say I only *support*, supposing that it pleases Omniscience to preserve me for some ends which I cannot understand, but which I trust belong to the great plan of goodness and mercy belonging to the Divine Mind.

“ I have made another visit to Laybach, and have

seen some new and beautiful scenes. The valley of the Save, with its cataracts and lakes, particularly struck me. I have seen nothing so beautiful in Europe. It suits me better to wile away my days in this solitary state of existence, in the contemplation of Nature, than to attempt to enter into London society, where recollections call up the idea of what I was, and the want of bodily power teaches me what a shadow I am. I make notes in natural history, fish, and prepare for another edition of my *Salmonia*; ride amongst the lakes and mountains; and attach the loose fringe of hope as much as possible to my tattered garments. I am now going to Ischl, where there are warm salt baths, to try if they will renovate the muscular power of my arm and leg. This is a new experiment. I am disposed to think, with Dr. Philip and Charles Bell, that the radical evil in my case is diseased sensibility in the nerves of the digestive organs, affecting by sympathy the whole sensorial system, and that the determination of blood to the head is only a secondary system.

“ I intend to be in Ischl till the end of July. You will know by the time when you receive this letter, whether I have a chance of hearing from you. If not, you had better address me at Laybach, where I intend to be again some time in September. I wish to go to Trieste in October, to make the experiments I have long projected on the torpedo. God bless you, my dear John !

“ Your affectionate friend and Brother,

“ H. DAVY.”

From Ischl he thus wrote to me:—

“ Ischl, June 24, 1828.

“ MY DEAR JOHN,

“ I received your letter, addressed to me at Ratisbon, here, a few days ago; it was dated Corfu; but from the names of the friends you mention, I conclude it must have been transmitted from Malta. I am sorry that you feel indisposed; but with your temperate habits, knowledge of your constitution, and medical skill, I doubt not that your indisposition will be transient. I have been here a fortnight; the scenery is beautiful, the temperature agreeable, and the Traun contains trout and grayling. I have used the warm saline baths with, I think, beneficial effects, and I shall continue to use them as long as they seem to do me any good. I have nearly recovered the flexibility of the affected limbs, but not their former strength; and this I can hardly hope to do as long as I am obliged to live so low, and use so much aloetic medicine, but I shall go on,—‘speranza.’

“ I am afraid you are in a bad situation for assisting me in my inquiries respecting natural history; but the governor\*, who I know is an ardent and excellent sportsman, may aid you. The other day, at Laybach, I ascertained that the double snipe, which I shot as late as the 17th May, fed only on a particular white larva, which I believe is found in Europe only in the early spring and late autumn. I should like exceedingly to know if the stomachs of those which migrate through the islands in the Mediterranean contain the same kind of food. I strongly suspect that the peculiar habits of locomotion of these animals depend upon the places and times where this food is found: the common snipe

\* The late Hon. Sir Frederic Ponsonby.



seems equally fond of earthworms, and every kind of larva; but in the stomachs of the double snipe I have never found any other except this peculiar worm.

“If you meet with any officers or intelligent travellers who have been on the Black Sea, pray inquire if the hucho and if the eel are found there. I should suppose that the eel is unknown both in the Black Sea and the Caspian. You may see some Russians in Sir Edward Codrington’s fleet who can give you information on this subject. I suppose the hucho will be found in the Don, Dniester, and Dnieper, which will be, if my conjecture is true, without eels.

“I hardly know what place to fix upon for the purpose of a secure point of correspondence. You may as well address here, as the letters will be forwarded as long as I continue in Austria. Should I become convalescent, and go to Italy, I shall hope to see you there. Pray present my compliments to Sir Frederic Ponsonby, and remember me very kindly to Sir Edward and Lady Codrington, Mr. Frere, and Sir John Stoddart.

“I am, my dear John,

“Your most affectionate Brother and Friend,

“H. DAVY.

“Let me know, if you can, if any ‘salmo’ is found in the warm parts of the Mediteranean; *i. e.* if there is any fish analogous to our sea trout.”

In his journal on the 23d of July, at the same place, he writes,—“This day completes my bathing here. I have used forty-one douches and baths,—a fair experiment. I hardly know if I have gained from the use of the saline water. *Generally*, I have gained a little in the

flexibility of the limbs: the fly-rod, I think, has been more useful than the element on which it is used."

His mind at this time, as if refined and sharpened by the discipline to which the corporeal system was subjected, appeared to have been even more than usually active and contemplative. His note-books as well as letters indicate this. It was now that he wrote a considerable part of the additions which he designed for a second edition of "*Salmonia*," in value exceeding and in bulk almost equalling the original text. It was here that he planned, in part, his last work, so appropriately named, "*Consolations in Travel*," or, "*The Last Days of a Philosopher*," and composed the first portion of it, the opening dialogue, called "*The Vision*," the sketch of which he began on a cloudy day, when the water was still discoloured by late rains, and consequently unfavourable for fly-fishing. And he appears to have contemplated at the same time other works, of most of which merely hints remain,—works, like "*Consolations in Travel*," and "*Salmonia*," which would have amused him in writing, without requiring a greater degree of mental exertion than was compatible with the kind of repose which he had prescribed for himself. Of these, two may be deserving of particular mention,—one, memoirs of himself,—the other, the modern Socrates. Bearing date of the 18th June, *Ischl*, is the following allusion to the first, written in his Journal, and so written, as clearly to indicate how humbly he thought of himself.—"To the adventures of an atom, could I not add, the adventures or memoirs of *H. D.* This would be, perhaps, a useful labour,—like Boyle's it might be done without affectation, and give practical lessons." Of the second, "the modern Socrates," the design or argument is briefly given "against all plans

of vague ambition; for the simpler pleasures of our nature; and for utility,—against war, states-craft, &c., for angling, shooting, the sciences,—against the glory of lawyers, warriors, &c.”

From Ischl he renewed his wanderings on the 26th of July; and by slow journeys, fishing and shooting by the way, he arrived at Salzburg on the 10th of August. From thence he as slowly returned towards Laybach, lingering amidst the magnificent scenery of these romantic regions, unwilling, as it were, to leave them, and yet requiring change.

At Wurzen, where he stopped a few days, and where the rain confined him more than usual within doors, he amused himself with writing a little romance, “The Last of the O’Donoghues: an Irish Story,” which, as a literary curiosity, I inserted in my former memoirs of his Life.

This story he finished, I believe, at Laybach, where he arrived on the 30th of August, and from whence I received from him the following letter:—

“Laybach, Sept. 25, 1828.

“MY DEAR JOHN,

“I have just received your letter of the 25th July, which I have read with much satisfaction; it has removed some anxiety which a former letter had given me respecting the state of your health. Your pursuits, I know, when you are well, will be both useful and interesting, and connected with the improvement of your profession and the advancement of general science.

“I am much obliged to you for the hints you give me respecting the causes of the migration of birds; and I think the principle will apply generally to that of ani-



mals. The instinct or strong feeling which leads to these migrations is, I believe, generally connected with want of food; but I have no doubt it may be excited by other causes, which are ultimately related to the same want. Thus, in this province, the quails have already disappeared, though the grain on which they feed still is abundant in the fields; and I believe they were driven away by a storm, which covered the mountains with snow, and was to them the omen of the approach of the Alpine winter. I doubt if the same causes which influence the health of man have much effect upon that of animals, who live according to natural laws, and not arbitrary customs, and whose lives and conduct, when they have not been domesticated, are under the influence of strong and invariable instincts. The insect which you call a caterpillar, that you found in the stomach of the double snipe, I have no doubt was a hexapode larva of a tibula, which I have always found, both in the spring and autumn, in the stomachs of these birds, and which I have no doubt constitute their favourite, if not their only food. I am glad you have so agreeable a society at Malta, and that you have health to enjoy it. Pray remember me in a particular manner to your new admiral,\* and put him in mind of some very pleasant days we passed together at the Duke of Athol's, where his pursuit was hart shooting, and mine grouse shooting.

“I will not enter into a detail of my nervous infirmities. I endeavour, as much as I can, to forget them. It is now six weeks since I have closed my seton, and I think I am better for it. I have much the same hopes as I had when I was here before in May, 1827, and from the same causes. You will recollect the letter I

\* Vice-Admiral Sir Pulteney Malcolm.

wrote to you at that time. I hardly know what my future plans will be. They must depend a good deal on a letter which I am now expecting from Lady Davy. If you do not hear from me again within the next fortnight, write to me at Rome. Whether I shall be there or no is very uncertain. At all events, I take the chance. God bless you, my dear John,

“Your affectionate Friend and Brother,

“H. DAVY.

“You will have seen ‘Salmonia’ by this time. I have made the second edition twice as large, and I hope twice as amusing. It contains many of my philosophical views, and some new and I hope true opinions in natural history. I send the copy for the second edition to Murray by the next opportunity.”

From Laybach, on the 6th of October, he went to Trieste, expressly for the purpose of trying the experiments he had been long meditating on the electricity of the torpedo. The results of some former trials made in 1814 and 1815 had created doubts in his mind, that the power which this fish exercises in giving shocks is identical with any known form or variety of electricity. It occurred to him that it might be a new species of electricity, as different from common electricity as that is from voltaic, or as voltaic electricity is from magnetism. The results he had hitherto obtained were negative, and so far in favour of this idea. He now wished to subject it to a new test, the magnetic, which he conceived would be decisive.

On the evening of the 8th he arrived at Trieste; and the following day, having, through the kind assistance of our consul, George During, Esq., procured two lively

and recently caught torpedos, he instituted his experiments, the results of which were still negative, the shock of the fish transmitted through a galvanometer not indicating the slightest magnetic effect.\* On his return to Laybach he communicated his views on the subject, and the results of his experiments, to the Royal Society, in a paper, which was his last contribution.

On the 31st October he quitted Laybach to proceed to Rome, where he arrived on the 18th of November. During the next two months and a half I received from him the following letters:—

“Rome, Nov. 23, 1828.

“MY DEAR JOHN,

“I have been much disappointed in finding no letters from you on my arrival here. Yet I wrote two letters from Austria and Illyria through the same channel (Trieste) by which you had before received them. I expected letters both at Bologna and here. I shall expedite this letter by the mail which goes to Corfu, and I hope you will receive it in a shorter time than by Marseilles. I shall say little about myself, except that the greatest pleasure I could receive would be from seeing you. I think I am better, but I have been exceedingly annoyed by the conduct of a servant,

\* \* \* \* \*

and I fear I shall have the whole trouble of dismissing my establishment, and forming a new one, unless I can find some charitable persons here to assist me.

“Morichini is extremely kind to me, and thinks I shall get well. The weakness and numbness in my left leg and hand still continue, but I think are less. In

\* Owing, I believe, to the human body having been made part of the circle,—Vide Phil. Trans. 1834. Part 2d.



short, with perfect quiet, which I came abroad to seek, I think I should be comfortable.

\* \* \* \* \*

“The weather is beautiful. Days of bright sunshine, but no cold nor heat. I take exercise, and shoot as much as I can; but there is little to shoot now. The Campagna is too dry for snipes, and I cannot beat the woods for cocks; so I content myself with a few quails.

“I got at Trieste a fine active torpedo, and satisfied myself that the shock did not affect the magnet. Is it a new kind of electricity, developed by the nerves? I have sent a paper on the subject to the Royal Society.

\* \* \* \* \*

“God bless you, my dear John!

“Your affectionate Friend and Brother,

“H. DAVY.”

“Rome, Dec. 21, 1828.

MY DEAR JOHN,

“I have just received your letter, which has given me much pleasure. I continue much as when I wrote to you last. My limbs continue weak; my digestive functions I think improved, and my tongue has almost lost its fur. I had hoped you might have paid me a visit; I now despair of this here; yet, perhaps, in the spring you could come to me at Trieste, and see me in Illyria. I would then show you my kind little nurse, to whom I owe most of the little happiness I have enjoyed since my illness. I shoot here a little, mount my ponies, and employ myself a good deal in literary pursuits. I have finished the Dialogues, and with one of them I am exceedingly pleased. You will find the

second edition of 'Salmonia' quite a new work, and I hope far better than the first. Walter Scott has written a review of the first edition, which I am told is exceedingly laudatory.\*

"Poor Dr. Wollaston has an attack of paralysis, and I am sorry to hear is without hopes. His severe and ascetic life has not preserved him. This complaint is certainly becoming more common in England. I have heard of two or three other friends who have likewise suffered,—spare, abstemious men; James Macdonald is one of them.

"I believe I told you I had closed all my drains, setons, and blisters. It is now four months. I have certainly not been worse, and I have lived rather more freely; but in every respect I have continued extremely temperate.

"I told you of my experiments on the torpedo. I am making some here, comparing the force with that of the common electricity. We have very fine weather, but bad shooting, from the want of water. Write to me as often as you can; and believe me to be,

"My dear John,

"Your most affectionate Friend and Brother,

"H. DAVY.

"Monsignor Spada is my chief companion here. That most amiable man desires to be kindly remembered to you. The Guiccioli is likewise here; but I have not seen her yet. Morichini and the professors of the Sapienza do all they can to assist me in my electrical experiments."

\* Quarterly Review.

Rome, Jan. 30, 1829.

“MY DEAR JOHN,

“I have been long hoping and expecting to hear from you in vain. I have received but one letter from you since I have been here. Since the last month the weather has been very bad,—rain, and sirocco; and I have suffered more, both in my limbs and stomach, than at any time since my illness. The pain and palpitation in the region of the heart has increased almost alarmingly, and I do not think I have gained any strength in the weak limbs. This is all notwithstanding diet and discipline, and I suspect mine is a desperate stomach case.

“I have finished *four* dialogues. I question whether they are poetical or philosophical. The last\* is, I think, a fair statement of the hopes which may be founded on metaphysical considerations of the indestructibility of the sentient principle; but, after all, we merely confess our ignorance. The second edition of ‘*Salmonia*,’ quite a new work, is sent to the press. I think it will amuse you. It has amused me much.”

“I have been making new researches on the torpedo.

\* \* \* \* \*

“I suspect the use of their electrical organs is not at all understood. I believe it is connected with their digestion. Pray write to me as soon as you receive this letter. I shall go north in the beginning of March. I hope I shall live to go back to Laybach.

\* \* \* \* \*

“Should I die before, you will, I think, find my Dialogues in a state for *publication*; if I live, I shall make them more perfect.

\* “The Proteus, or Immortality;” the 4th dialogue in “*Consolations in Travel*.”



“ If you do not receive this letter till March, write to me at Laybach; but I hope I shall hear before, that I have a chance of seeing you.

“ The Vice-Legate often comes to see me, and often asks for you.

“ God bless you, my dear John!

“ H. DAVY.

“ You will have heard of poor Wollaston’s death. He lived to communicate his process for platina to the Royal Society. This was his last work, which he considered a duty.”

On the 1st of February, two days only after this letter was written, he writes in his journal,—“ Finished the dialogues fifth and sixth,” which were the whole number in the “ Consolations in Travel.” And immediately after he adds, in Italian,—“ Si moro, spero che ho fatto il mio dovere, e che mia vita, non e stato vano ed inutile.”

On the 6th of February he addressed the following letter to Mr. Poole; and it was his last to him:—

“ MY DEAR POOLE,

“ I have not written to you during my absence from England, because I had no satisfactory account of any marked progress towards health to give you, and the feelings of an invalid are painful enough for himself, and should, I think, never form a part of his correspondence; for they are not diminished by the conviction that they are felt by others. Would I were better! I would then write to you an agreeable letter from this glorious city; but I am here *wearing away* the winter,—a ruin amongst ruins! I am anxious to hear from

you,—very anxious; so pray write to me with this address, ‘ Sir H. Davy, Inglese, posta restante Rovigo, Italia.’ You know you must pay the postage to the frontier; otherwise the letters, like one a friend sent to me, will go back to you. Pray be so good as to be particular in the direction; the Inglese is necessary. I hope you got a copy of my little trifle, ‘ Salmonia.’ I ordered copies to be sent to you, to Mr. W., and to Mr. Baker; but as the course of letters in foreign countries is uncertain, I am not sure you received them; if not, you will have lost little: a *second edition* will soon be out, which will be in every respect more worthy of your perusal, being, I think, twice (not saying much for it) as entertaining and philosophical. I will take care, by early orders, that you have this book. I write and philosophise a good deal, and have nearly finished a work with a higher aim than the little book I speak of above, which I shall dedicate to you. It contains the essence of my philosophical opinions, and some of my poetical reveries. It is like the ‘ Salmonia,’ an amusement of my sickness; but ‘ paulo majora canamus.’ I sometimes think of the lines of Waller, and seem to feel their truth—

“ The soul’s dark cottage, batter’d and decay’d,  
Lets in new light through chinks that Time has made.”

“ I have, notwithstanding my infirmities, attended to scientific objects whenever it was in my power; and I have sent the Royal Society a paper, which they will publish, on the peculiar electricity of the torpedo, which, I think, bears remotely upon the functions of life. I attend a good deal to natural history; and I think I have recognised in the Mediterranean a *new species of eel*, a sort of link between the conger and the

murœna of the ancients. I have no doubt Mr. Baker is right about the distinction between the conger and the common eel. I am very anxious to hear what he thinks about *their generation*. Pray get from him a distinct opinion on this subject. I am at this moment getting the *eels in the market* here dissected, and have found *ova* in plenty. Pray tell me particularly what Mr. Baker has done; this is a favourite subject with me, and you can give me no news so interesting. My dear friend, I shall never forget your kindness to me. You, with one other person, have given me the little happiness I have enjoyed since my severe visitation.

“I fight against sickness and fate, believing I have still duties to perform, and that even my illness is connected in some way with my being made useful to my fellow creatures. I have this conviction full on my mind, that intellectual beings spring from the same breath of Infinite Intelligence, and return to it again, but by different courses. Like rivers born amidst the clouds of heaven, and lost in the deep and eternal ocean,—some in youth, rapid and short-lived torrents; some in manhood, powerful and copious rivers; and some in age, by a winding and slow course, half lost in their career, and making their exit by many sandy and shallow mouths. I hope to be at Rovigo about the first week in April. I travel slowly, and with my own horses. If you will come and join me there, I can give you a place in a comfortable carriage, and can show you the most glorious country in Europe,—Illyria and Styria; and take you to the French frontier before the beginning of autumn,—perhaps to England. If you can come, do so at once. I have two servants, and can accommodate you with every thing. I think of taking some baths before I return into Upper Austria; but



I write as if I were a strong man, when I am like a pendulum, as it were, swinging between death and life.

“God bless you, my dear Poole!

“Your grateful and affectionate Friend,

“H. DAVY.

“Pray remember me to our friends at Stowey.”

From this time till the 20th his state of health continued variable; and he continued (as appears from his journal) to have occupied himself variously,—in shooting, in examining the structure of the torpedo, in electrical experiments, in sketching the characters of distinguished men his contemporaries, and in making additions both to ‘Salmonia’ and his new Dialogues.

On the 20th, most unexpectedly, for there had been no premonitory symptoms, and quite suddenly, he had that severe attack which ultimately proved fatal. That morning (as he told me afterwards) he felt better than usual,—his pulse about 68°; the tongue clean; the ordinary functions of the body well performed. After breakfast he had sat some time, dictating an addition to the sixth Dialogue; when he had finished it he attempted to rise to go into his bed-room, which was adjoining; but found that he could not stand, and that he had lost all power over his limbs, without pain of head, or vertigo, or loss of power of intellect, accompanied merely by a feeling of sickness of stomach. Medical aid was immediately had; leeches were applied to the temples, as if the brain had been affected; and a lowering (or, as it is called, antiphlogistic) plan of treatment was pursued, but with no good effect. He spent the night very restlessly, and the following morning the

right side was quite powerless, and the stomach much deranged. On the 23rd he dictated the following letter to me; it is very descriptive of his state, and of the tone and powers of his mind :—

“MY DEAR JOHN,

“Notwithstanding all my care and discipline, and ascetic living, I am dying from a severe attack of palsy, which has seized the whole of the body, with the exception of the intellectual organ. I am under the usual severe discipline of bleeding and blistering; but the weakness increases, and a few hours or days will finish my mortal existence. I shall leave my bones in the Eternal City. I bless God that I have been able to finish all my philosophical labours. I have composed six dialogues, and yesterday finished the last of them. There is one copy in five small volumes complete; and Mr. Tobin is now making another copy, in case of accident to that. I hope you will have the goodness to see these works published.

“The second edition of ‘Salmonia’ by this time is, I believe, printed. I have given you, by a codicil to my will, the copyright of these books, and I shall enclose you an order on Murray for the profits of the first edition of ‘Salmonia.’ God bless you, my dear John! May you be happy and prosperous!

“Your affectionate Friend and Brother,

“H. DAVY.”

It was signed by him; and he added in his own handwriting, only just legible, “Come as quickly as possible.”

On the 25th he dictated another letter, which I shall also give; for it is very characteristic of the zeal with

which he pursued science, and his unextinguishable ardour in the pursuit:—

“MY DEAR JOHN,

“If I had not had this attack it was my intention to have gone to Fumicina or Civita Vecchia to make some experiments on the torpedo. I hope you will take up this subject, which, both as a comparative anatomist and chemist, you are very capable to elucidate. You will see my paper on the torpedo in the manuscript book, which I have left in Mr. Tobin’s hands. It was my wish to have exposed an unmagnetised needle to the continued shocks of a torpedo in a metallic spiral, making the metallic communication perfect with both electrical organs. There is in my little box an apparatus for this purpose, which I hope you will use. Large living torpedos may be procured at Fumicina or Civita Vecchia. The shock from a very small jar will make a needle magnetic, provided it is entirely passed through the metallic conductors; but I did not find this effect when there was any interruption by water. There are many things worth attending to in the two kinds of torpedinal fishes found here—the tremula and occhia-tella. Pray do not neglect this subject, which I leave to you as another legacy. God bless you, my dear brother!

“Your affectionate Friend,

“H. DAVY.”

Beneath he made an attempt to write, and did write, “My dear John,” but no more. His amanuensis wrote the following postscript, from his dictation:—  
“I have written to you, but I fear you have not got the letter. I have this moment received your address. I am dying. Come as quickly as you can. You will not see me alive, I am afraid. God bless you!”



As he supposed, I did not get his first letter in time ; indeed, it followed me to Geneva, where I found it on my arrival from Rome, and I read it only a few hours before he expired. His second letter I was so fortunate as to receive in a very short time, and I was able to leave Malta, where I was then stationed as Physician to the Forces, three or four days after, through the kindness of Vice-Admiral Sir Pulteney Malcolm, who allowed me a passage to Naples in his tender. The voyage was a tedious one of six days. I landed at Naples on the 14th of March ; at twelve o'clock at night I set out with the courier, and arrived at Rome early on the morning of the 16th.

I shall now, in continuance of my narration, give some account of the time I attended him at Rome, of our journey from Rome to Geneva, and of the termination of his earthly career in that city.

I shall not attempt to describe my feelings on receiving the last letter I have given, making known to me so suddenly and unexpectedly the dangerous illness of a brother who had acted the part of a father to me ; whom I regarded as a brother, a teacher, and most kind friend, and to whom I necessarily owed very much of what I most valued in life. My anxiety naturally increased the nearer I came to Rome. In vain I sought for fresh letters and additional information at Naples. When I entered Rome, I knew not where to find him, for his address in that city was not sent. I in vain went from one hotel to another, making inquiries, without being able to hear any thing of him. I fortunately recollected that his friend Morichini was a physician, and a resident in Rome. He was easily found ; and presently I had a comfortable message from him, that my brother that morning was rather better, accompanied

with a direction to his lodging; and in a few minutes I was by his bedside. Never shall I forget the manner in which he received me; the joy that lighted up his pale and emaciated countenance; his cheerful words and extreme kindness, and his endeavours to soothe a grief which I had not the power of controlling, on finding him so ill, or rather at hearing him speak as if a dying man who had only a few hours to live, and who wished to use every moment of such precious time. With a most cheerful voice, a smile on his countenance, and most warm pressure of the hand, he bade me not be grieved, but consider the event as a philosopher. He expressed his pleasure at seeing me so soon, and in having me with him in his last hours, and firmly rejected all expectation and hope of recovery. He said when he experienced the attack, just as he had concluded his Dialogues, he was sure his career was run; but, though persuaded of this, he had not rejected medical aid, and had followed the prescriptions of his physicians. Now I had arrived, he was contented; and he began immediately to speak of those things on which he wished to make me acquainted with his sentiments. A year and a half has now elapsed, and I write only from recollection.\* In the notices I shall give, I shall endeavour to be as accurate as I can.

The subjects which now interested him most were, the peculiar electrical power and anatomical structure of the torpedo (the subject of his last letter to me, which I have given), and on which, just before his attack, he was making observations, and preparing to make fresh experiments; his last "Dialogues;" and the second edition of "Salmonia." On these subjects he spoke

\* The time referred to above was the Summer of 1830.

fully, especially on the first; and begged that I would immediately take up the inquiry, and go next morning to the fish market and procure some torpedos, that, with the fish before us, he might point out what he considered most deserving of notice. When my first agitation had subsided, and I had leisure to make inquiries into the exact state of his disease, I took hope; though when I expressed my hopes, he shook his head, and, with an incredulous smile, said it was useless, or something to that effect. His symptoms at this moment were not at all alarming. The intellect was perfectly clear; the functions were tolerably well performed; the pulse not very rapid; and he had so far recovered the powers of the muscles of his limbs that, with some aid, he could rise, and go into the sitting-room; and that day he rose and dined in his room, and made a tolerable dinner on some roast chicken and spinach.

The greater part of the day I sat by his bedside, reading the "Dialogues," stopping occasionally to discuss particular parts. His mind was wonderfully cheerful, and tranquil, and clear, and in a very affectionate and most amiable disposition, and the expression of his countenance corresponded. He had lost all the irritable feeling to which he was very liable before, during his valetudinary state, and which was sometimes very distressing both to himself and those around him, and which generally accompanies paralytic complaints. His manner, his voice, and the expression of his countenance, the sentiments he expressed, his powers of argument, all gave the idea that the intellectual organ (to use his own words) in the attack had escaped unhurt. It was difficult to conceive such power of mind, when the body was near its dissolution; medically it seemed incompatible. At the



same time, his own conviction that he was a dying man, connected with the many peculiarities of his complaint, and the tendency there sometimes is to believe easily what is dreaded, as well as what is wished, almost persuaded me that his conviction of rapidly approaching death, founded on internal feeling, was true, and that the brilliancy of his mind was a "lightning before death."

On the following morning I procured some torpedos from the fish market, and began an examination of this curious fish, which I dissected in an adjoining room, and I was employed alternately in reading to him the "Dialogues," or when not with him, as when he wished to repose a little, in carrying on my dissection, and occasionally showing him the results, and reading to him my notes of them,—all which not only amused, but interested him deeply.

Thus several days passed, his mind continuing much the same; he gradually became worse. He declined the attendance of his physicians, except that of Dr. Morichini, whom he saw as a friend; he would take no medicine, except the acetate of morphia, which he used in large doses (and which had always the temporary effect of relieving uneasy sensations, and procuring sleep), and aperient medicine, with the intention of counteracting its constipating tendency. He gradually grew worse, and especially when I had finished the reading of the "Dialogues," and he had spoken to me concerning all the subjects on which he wished to express his sentiments. He appeared now to be very much without motive for exertion, and considered this the exact and appropriate time for his death. His appetite failed him; his bowels became very constipated; there was a distressing dysuria, a very rapid pulse, profuse

perspiration, a wandering of the mind on awaking from sleep; and during sleep a very irregular respiration, very slow, and sometimes spasmodic. He was at the worst on the 31st March. On that day his pulse was amazingly rapid, more than 150 in frequency; and his respirations, at one time, were only five in the minute. He would take no food, and he believed himself dying,—as I did also, and often during the day expected that he would breathe his last. Yet, even on that day, he now and then rallied his powers, and his mind recovered its distinctness and clearness, and required amusement. At his request, I read to him about the first half of Mr. Moore's "Epicurean." The sad colouring and melancholy sentiment which pervade that elegant little work, with the wildness of some parts of the fiction, and its marvellous subterranean scenery and incidents, pleased him much. At night he would not allow me to remain in his room, not even on a couch, as I had done before. He was sure he should die that night. He took leave of me most tenderly, kissed my cheek, and bade "God bless me!" His mind was perfectly tranquil, even as much so as on my arrival, but his symptoms were of a very different character; and witnessing the sudden changes which had taken place during the day, I believed that now indeed I was about to lose him, and that I should never again hear his voice of kindness. During the night, when I went into his room, I had the satisfaction to hear him breathing; and the reports of his servant, who had a bed in his room, when he came to me, were not unfavourable. The following morning, when I went to him and drew back his curtains, he expressed great astonishment at being alive. He said he had gone through the whole process of dying, and that when he awoke he had difficulty in convincing himself

that he was in his earthly existence, and that he was under the necessity of making certain experiments to satisfy his mind that he was still in the body; as by raising the hand and intercepting the light, lifting the bed-clothes, closing the eyelids, &c. He added, that his being alive was quite miraculous, and he now began to think his recovery not impossible, and that it might be intended by Divine Providence that his life should be prolonged for purposes of usefulness. This change of opinion in regard to the possibility of his own recovery, gave me at the moment almost the delight that his recovery itself would have done, for I thought it promised it; and I enjoyed, I suppose, the pleasure in the anticipation, and at least in the revival of hope, at a time when all hope had ceased. The election, the same day, of a new pope, who took the name of Pius VIII., somehow, I think, aided in removing his former impressions of impending death. Now he was very willing to follow any course of medical treatment that I would recommend, and to be guided in all things by my advice as his physician, and to consider himself my patient. And without loss of time I proposed a plan of treatment, which was instantly entered upon; namely, the use of aperient medicine, combined with sulphate of quinine and acetate of morphine, and aided by a tolerably nourishing diet. From this day he pretty rapidly improved; all the distressing symptoms diminished, and in a few days they had entirely disappeared; and a change also had taken place in the state of his mind. Now that he was intent on recovery, he no longer took the same deep interest in *my* examination of the torpedo, as if he looked forward to the time when *he* should be able to enter into the investigation actively again; nor did the same kind of reading altogether interest him.



I remember, on the day of his revival, proposing to resume the story of "The Epicurean." He objected to it, and said it was too melancholy. He preferred Shakspeare's plays; especially his comedies; and the "Arabian Nights," and "Humphrey Clinker." He delighted in hearing these read; and he was not comfortable unless some one was with him almost constantly during the day reading to him.

When he had begun to mend a little, and my hopes were strengthened of his recovery, Lady Davy arrived from England, and brought him a copy of the second edition of "Salmonia," which gave him very great pleasure; and, with his usual ardour, he began the reading of it immediately. In a few days, he expressed a desire to go out in the carriage. The weather was delicious during the whole of the month of April; spring weather, I may say, really, according to the ideas of our poets; the air balmy; "warmth without heat, and coolness without cold;" the thermometer seldom above 70°, and rarely below 60°; the rains over; the sky clear, of its mildest blue, and the Campagna green, of the freshest tint; the gardens and groves bursting into foliage, and the distant mountains of that dark blue which is almost peculiar to Italy and Greece when the sky is clear and not parched. I look back to this time with a very great pleasure, and shall ever remember these drives in the neighbourhood of Rome with this feeling. To him they were particularly agreeable. The soft cool breeze refreshed him; he liked to expose himself to it, especially his forehead. The delightful scenery, the cheerful appearance of the beautiful environs of Rome at this spring-time, the season of life and hope, seemed to exercise a restorative power over him,—to soothe, and please, and give hope. The second day

that we went out he took me to the milky stream of the little Albula lake, which he has described in the third dialogue of the "Consolations in Travel," that I might have an opportunity of seeing its singular character; and, whilst I left him for this purpose, he got out of the carriage, and began to practice himself in walking, and on my return I found him sitting on a stone on the green flowery turf, and enjoying the Campagna, then most fresh and green, and beautifully contrasted with the adjoining wooded hills of Tivoli, and the few massive ruins of ancient buildings, appearing here and there above the vast expanse of verdure.

Another day we drove into the Campagna, towards Albano, to visit the finest of all the approaches to Rome, where every object which meets the eye is impressive, and a relic of former times and the period of Rome's greatest grandeur,—the colossal tombs by the road side, and scattered over the plain; the artificial inequalities of the surface, and tumuli; and, most impressive of all, the vast aqueducts running parallel towards the city, their lines broken, and their lofty arches giving the idea of enormous temples. As was our custom, we got out at the end of our drive, and walked a little way on the Campagna for exercise; and whilst we walked conversed on the subject of the extraordinary scenery around us,—so ancient, and yet the soil of volcanic sand, and still glittering with minute crystals of volcanic origin, mixed with fragments of red brick and pottery, and, owing to its arid and silicious nature, without calcareous or aluminous earth, giving to this part of the plain the character of sterility. But his favourite and our most frequent drive was on the way to Civita Vecchia, either close to the Tiber, or at a little distance from the course of the

river, through the beautiful hilly region which stretches in that direction,—a succession of gardens, vineyards and orchards, villas and farm-houses, interspersed; the road lined with trim hedge-rows, reminding one of England; the orchards in full bloom, and the vineyards rapidly sprouting and bursting into leaf, under the influence of the warm sun and air. This part of the environs used to be frequented by him, when able to amuse himself with his gun; and we generally stopped at the distance of four or five miles, where, between the hills, there is a little open green plain in pasture, and where a sheltered hollow, rich in wild flowers of the spring, close to the road, was convenient for making his attempt at walking, and for sitting a little while in the open air, where the singing of the skylark and other birds made it very agreeable, and he had manifest pleasure in lingering.

Were I to comply with my feelings, I should indulge myself in retracing, in memory, all our other drives in different directions round this wonderful city,—to the hilly road beyond St. Peter's, from whence the dome of that magnificent church, looking down upon it, is seen in minute detail in all its vastness; to the different gardens, in that princely style of grandeur of art and rich luxuriance of nature so happily blended at Rome, and nowhere else to be seen in such perfection; and to the great ruins of antiquity, which from magnitude astonish and delight, no less than by their picturesque beauty,—the rose, the vine, the cypress, and the olive luxuriating amidst their decay, especially on the Palatine, where the guides are gardeners, and the richest cultivation is mingled with and interrupted by ruined walls, and fallen masses and buildings in every stage of decay. After the confine-



ment of a sick chamber,—after the abandonment of hope of recovery, to visit these scenes with my patient, daily, sensibly improving, was enjoyment indeed; and the circumstances, and the occasion, I suppose, gave their tinge of feeling to every thing around, and helped to make an impression on my mind, which will be durable always, of admiration of the scenery, and of its wonderful power of interesting beyond all other scenes I ever witnessed. I must not omit mentioning that, as he mended, the sentiment of gratitude to Divine Providence was overflowing, and he was most amiable and affectionate in manner.\* He often inculcated the propriety, in regard to happiness, of the subjugation of self, in all selfishness, as the very bane of comfort, and the most active cause of the dereliction of social duties, and the destruction of good and friendly feelings; and he expressed frequently the intention, if his life were spared, of devoting it to purposes of utility (seeming to think lightly of what he had already done), and to the service of his friends, rather than to the pursuits of ambition, pleasure, or happiness, with himself for their main object. So rapidly did he improve, that he was able to go in the carriage to witness the splendid illumination of St. Peter's, on the night of Easter Monday,

\* On the 20th April, he wrote the following note to his sister, at the end of a letter of mine to her,—and it was his last:—

“MY DEAR SISTER,

“I am very ill, but thanks to my dearest John, still alive. God bless you all.  
H. DAVY.”

This, I have great pleasure in recollecting was written from the impulse of strong feeling in accordance with what has been related in the text, on the occasion of my telling him that I was writing home. He wished to have expressed more; but his feebleness and slightly paralytic state of hand, made the using of a pen difficult.

and to quit Rome, on our way to Geneva, on the 30th of April; on due consideration, it appearing better to undertake the journey to a cooler climate, than to remain and encounter the heats of an Italian summer.

We travelled by easy journeys of from five and twenty to five and thirty miles a day, generally between breakfast and dinner, and stopped occasionally at the great towns, where the inns were comfortable, to rest for a few days. We took the road by Sienna to Florence, hoping that, though the inns are not so good on that as on the Perugino line of road, it would be less crowded by the English, then hurrying northwards from Rome; but our expectations were not answered. On the 3rd of May we arrived at Sienna. He bore travelling even better than I expected; and occasionally enjoyed the scenery, especially the beautiful wild mountain scenery, with its woods and lakes, between Ronfilione and St. Lorenzo, which the delicious weather we had, and the goodness of the road, and the rapidity and ease with which we travelled, made particularly agreeable; and hardly less so, in such delightful spring weather, was the ascent of the mountains to Radicofani, through the vine-clad glens and hills in the neighbourhood of Aquapendente, and the hilly pastoral region beyond it. At Sienna he rested a day. On the morning of the 5th of May we left it, and the same day arrived at Florence, where he recruited considerably, was in better spirits than usual, and stronger, and had a lively pleasure in an evening drive, once or twice in an open carriage, to the preserves of the Grand Duke, where there are so many circumstances combined to amuse and refresh an invalid, and especially a sportsman and lover of nature,—such as the luxuriant vegetation and

foliage of meadows, shrubberies, and groves ; the abundance of pheasants and other game ; and the Arno, at this season a fine clear and rapid river. He remembered that when he had been at Florence before, he had eaten the ortolan in great perfection. He wished now to see it, and examine this bird as an object of natural history ; but the season for it was hardly arrived. However, our intelligent courier procured one from a countryman, who was in the habit of catching these birds, and fattening them on bread and milk for the market, to which they are brought alive in cages. It was about the size and shape of a robin, but more delicate, with plumage not unlike that of the robin, without its red breast,—I believe it is the Provence wheat-ear of Latham (*Montacilla massilienis*, Lin.)

From Florence we went by Lucca, Carrara, Massa, Sassana, Pescia, and the new mountain and maritime road to Genoa, where we arrived on the 12th of May. This part of our journey, almost without any exception, was agreeable. The mountain air, the mountain scenery, the delicious weather, with all the charms of May, were very enjoyable ; the diversity of country, the triumph of art in the construction of this grand road, the magnificent views of the Mediterranean, its embayed and wooded shores, afforded ever-varying amusement ; and the inns generally were comfortable and quiet.

We remained at Genoa from the 12th to the 18th of May. The first three or four days he was pretty well, and able to take an evening drive in an open carriage round the ramparts of the town, which command those delightful views of the extraordinary suburbs, where villas, gardens, groves, in rich profusion, mixed together on the most rugged ground, bounded by the white city and blue sea on one side, and the green pre-



cipitous naked mountain in the opposite directions, are singularly contrasted, and form a whole which is at once grand, beautiful, strange. During the last two days he was unwell; it was a time of much anxiety, and it was doubtful if he would be able to leave Genoa. We proceeded next by way of Novi and Alessandria to Turin, where we arrived on the 20th. The mountainous part of the journey was very agreeable to him; the air cool, the scenery amusing, and the road good. There was heavy rain during part of the day, but it was followed in the afternoon by fine weather, accompanied by the delightful freshness of everything, and the increased beauty which, in the season of spring, and amongst mountains with abundant foliage and streams, the scenery always acquires. When we had passed the mountains, and entered upon the plain country,—when we had lost sight of the olive groves, and rarely saw the cypress, or the Mediterranean pine, and the vegetation indicated a cooler climate, the mulberry and poplar the prevailing trees, and the pasture of the brightest green,—the heat was greater, owing to the closeness of the air at the time, and travelling was tedious from the heavy roads. We stopped one day at Turin. At his desire, I visited the museum of the city, which is remarkably well kept, and rich in collections of natural history, especially of birds. I examined for him the water ousel, which has the singular and very curious habit of walking under water, and is alluded to in his “*Salmonia*.” He had inferred from analogy that it might be able to do this by means of air-pump feet, similar to those of the fly, and some other animals which walk against gravity; but I found its feet like those of the other birds of the great family *Passeres*, to which it belongs, merely fitted for grasping; and the intelligent naturalist,

who very obligingly showed me the specimen, told me that it ran along the bottoms of rivers only where there were stones for it to lay hold of.

On the 22nd we went to Susa, and slept there. The drive from Turin to Susa he enjoyed much. The summits of the Alps were covered with snow, whilst advanced spring displayed all its charms in the deep narrow valley, through which the greater part of the way winds; and here it was truly "*ver purpureum*," for owing to the excess of flowers of this hue, especially a bright-red vetch, this colour was even predominant over green. On the following day we crossed Mont Cenis, and slept at Lanlesburg. He had rather an apprehension of this day's journey, from the recollection of what we had experienced on a former occasion, already noticed, when we travelled together from London to Ravenna after his first attack; but the apprehension, I am glad to say, was not confirmed. Indeed, this was the most agreeable day's journey of all, and the one which amused and pleased him most. The road was in excellent order; the mules drew the carriage in the most easy manner. The sky was clear; the temperature of the air most agreeable, warmed by currents of air ascending from the plain, as was indicated in a striking manner in one spot in sunshine, on the brink of a precipice, where a vast number of minute bodies were seen in agitation, moving in all directions, chiefly upwards, which we supposed at first were insects, their motion being apparently under the influence of volition, but which proved to be minute portions of the down of a small thistle. He felt refreshed by the light mountain air, aided by the influence of the Alpine scenery, which at the time was unusually attractive. The winter horrors of the mountains had disappeared; spring had

nearly reached their summit; the snow remained only where it was most picturesque; the torrents were in full force, and animated the scene with their noise and motion, as much as the bursting vegetation enlivened it in its young green on the chesnut in the lower region, and higher up in the larch and Alpine pine, almost to the top of the ascent, where even these hardy trees showed the effects of winter,—the one without leaves, and the foliage of the other of a sallow and sickly green.

We reached the monastery of Mont Cenis about noon, but did not stop, excepting to get some trout from its tank, which he was very desirous of having; and he was much pleased when I returned to the carriage in a few minutes with two fine ones, which were taken out of the reservoir alive, especially as I had ascertained their temperature and the temperature of the water.

The air and dreary aspect of winter still lingered in the mountain glen, in which the monastery is situated; in the shade the thermometer was 48°; the surrounding peaks were still in their white winter clothing; the grass of the plain surrounding the lake, only just exposed by the melting of the snow, was withered, as if it had felt the southern sun and drought; and the lake itself exhibited a most singular appearance, from the shadows in it of the adjoining snowy heights, and from the mixture of snow, ice, and water on its surface. Our horses, which had been sent up at an early hour in the morning, took our carriage rapidly down to Lanlesburg, where we arrived about two in the afternoon,—on his part almost without the feeling of fatigue.

We renewed our journey the following morning, and slept that night at La Chambre. At this season these Alpine valleys through which we descended were in



great beauty, and truly delightful ; such a profusion of wild flowers ; such rich pasture meadows ; such a variety of shrubs, and so many of our garden plants wild ; and then the singing of the birds, the sweetness and freshness of the air, and the gushing of the clear streams.

The next day we went no further than Maltavern. It is a solitary inn, finely situated, and well kept. We arrived early ; and part of the afternoon my brother spent in the garden, sometimes walking, and when tired, sitting in an arbour covered with sweet-scented shrubs. The next day we passed through Chamberry to Aix, where I visited the baths, and made inquiries respecting their medicinal properties, with the idea that they might be fitted for him, and that it might be advisable to return to them from Geneva, if the physicians there should recommend trial of their waters. And by his particular desire I went to the adjoining lake of Burget, in which that rare and beautiful species of trout, the ombre chevalier, is found, in hopes of being able to get one, and collect particulars of its natural history,—a subject in which, even in his then state of health, he was so much interested, that he wished to visit the lake after his day's journey, merely to see the waters which fed a rare species of salmo, for there was no chance of procuring the fish itself, it being taken, as I was informed, in a distant and deep part of the lake.

The following day we went as far as the village of Frangi, through a beautiful country, in scenery, cultivation, and neatness, reminding one of some of the finest parts of the midland counties of England.

On the 28th of May we arrived at an early hour at Geneva, and took up our abode at La Couronne, an excellent inn, the mistress of which is distinguished for

civility; and I may add, that I found it combined with very kind and good feeling, for the calling forth of which an occasion too soon occurred.

This short day's journey my brother bore well. During it we had a good deal of conversation; he reverted to past times, the early period of his life, and to many of the more interesting parts of his life; and spoke cheerfully, and not without hope, in regard to the future amendment of his health. On our arrival at the inn he merely reclined on a sofa, and occasionally walked to the window, and looked out upon the lake, and expressed a longing wish to throw a fly, as he had been before in the habit of doing, on its waters and on his favourite Rhone. Here he learnt the death of his old friend, Dr. Thomas Young, as I have elsewhere observed.\* I was not present when Lady Davy made the communication to him; but when I returned I saw him affected, and he told me how deeply he had been affected by it, even to profusion of tears, and in a manner that was almost unaccountable. In a short time he recovered his composure, and conversed on indifferent matters.

At five o'clock he dined at table, and made a tolerable dinner. After dinner he was read to, according to his custom. At nine o'clock he prepared to go to bed. In undressing, he struck his elbow against the projecting arm of the sofa on which he sat. The effect was very

\* My brother, in his sketches of the characters of his distinguished contemporaries, thus notices Dr. Young:—

“ I must not pass by Dr. Young, called Phenomenon Young at Cambridge; a man of universal erudition, and almost universal accomplishments. Had he limited himself to any one department of knowledge, he must have been first in that department. But as a mathematician, a scholar, a hieroglyphist, he was eminent; and he knew so much that it is difficult to say what he did not know. He was a most amiable and good-tempered man; too fond, perhaps, of the society of persons of rank for a true philosopher.”

extraordinary: he was suddenly seized with a universal tremor; he experienced an intense pain in the part struck, and a sensation, he said, as if he were dying. He was got into bed as soon as possible. The painful sensations quickly subsided, and in a few minutes were entirely gone. There was no mark or hurt on the elbow, no pain or remaining tenderness; and the effect of the blow perplexed him no less than it did me. A slight feverish feeling followed, which he thought little of; he took an anodyne draught of the acetate of morphine, and then desired to be read to, that his mind might be composed to sleep by agreeable images.

About half-past nine he wished to be left alone, and I took my leave of him for the night, and for ever on earth. His servant, who always slept in his room, called me about half-past two, saying he was taken very ill. I went to him immediately. He was then in a state of insensibility, his respiration extremely slow and convulsive, and the pulse imperceptible. He was dying; and in a few minutes he expired. I thank God I was present to close his eyes! In death his countenance was composed and of its mildest expression, indicative of no pain or suffering in the separation of the immortal from the mortal part. This fatal moment was about three A.M., on the 29th of May. It seemed as if it were destined that his ashes should not be deposited, according to his pre-sentiment, in the "eternal city," but in a Protestant city; the place for which we had expressly left Rome, and where death seemed to have awaited him, and where every mark of respect that could be paid to his memory was willingly shown by the government of this free and literary republic; to the principal inhabitants of which he was personally known, and generally known by his reputation.



His funeral took place on the 1st of June, and was most respectfully attended.

The following was the arrangement of the procession, as given to me in writing: —

The Coffin, carried by Bearers.  
The Servants.

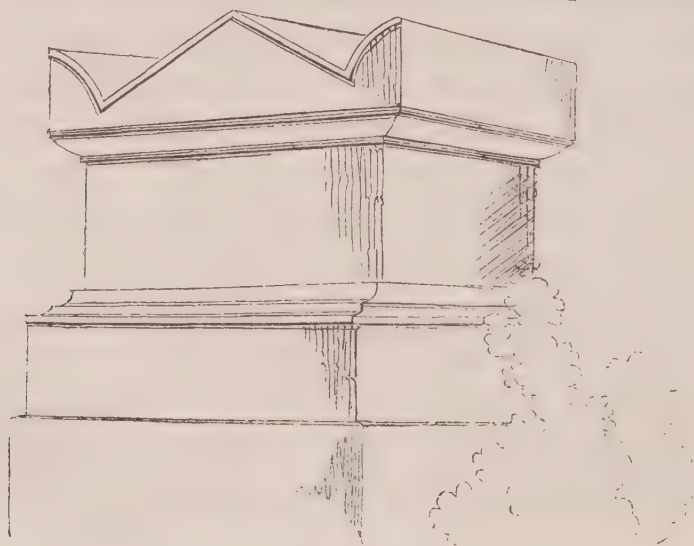
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John Davy, and the English Clergyman.  
The Academy.  
The Secretary of the Deceased.

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The Council of State and the Clergy.  
The English invited by the Committee  
of the English Chapel.  
The Society of Arts.  
The Physical Society.  
The Students of the Academy.  
The Public.

His remains were deposited in the burying-ground of the city without the walls, and close to the grave of Professor Pictet. This was in accordance with his wish to be buried where he died, expressed in an addition to his will, with the observation, “*Natura curat suas reliquias.*” The spot is marked by a simple monument,



erected by Lady Davy, on which is the following inscription :—

Hic jacet  
HUMPHRY DAVY,  
Eques Magnæ Britanniae Baronetus,  
Olim Regiæ Societ: Londin: Præses,  
Summus Arcanorum Naturæ indigator.  
Natus Penzantiæ, Cornubiensum, XVII Decemb: MDCCLXXVIII.  
Obiit Genevæ Helvetiorum XXIX Mai, MDCCCXXIX.

I should notice that the students of the university were desirous of marking their respect by carrying the body, and made an application to this effect; which was not acceded to, from an apprehension that it might serve as a precedent, and lead to irregularities in a ceremony which in Geneva is performed in a very simple manner, and much restricted by the sumptuary laws of the state.

Respecting the nature of the complaint and the immediate cause of the death of my dear brother, I have nothing to state that is at all satisfactory to myself. At its commencement, that is, after the first paralytic attack (it has been erroneously called apoplectic), in December, 1827, I was of opinion that there was some softening of the brain and some enlargement of the heart, without augmentation of its muscular substance. This opinion I expressed then to Drs. Babington and Holland, and I am now disposed to consider it as the most probable. It was my wish to have had the exact nature of his complaint and the cause of his death investigated by an anatomical examination. But this was contrary to his desire, and to a promise which I had made him at Rome. He had a dread of a *post mortem* examination, founded on an idea which occurred to his active mind, that it was possible for sensation to remain in the animal

fibre after the loss of irritability and the power of giving proof to others of its existence. Consequently, such an investigation not having been made, his disease, as to its exact kind and the immediate cause of his death, must ever remain doubtful.

I have now to speak of a work to which frequent allusions have been made in the preceding pages; a posthumous work, and my brother's only one, "*Consolations in Travel, or Last Days of a Philosopher*," on which I shall offer a few remarks, in its bearings on his own life and philosophical views.

It consists, as has been already mentioned, of six dialogues. The first dialogue, called the "*Vision*," is held between Onuphrio, Philalethes, and Ambrosio, and relates to the progress of society, the advance of science and art, and their influence on mankind; with speculations on intellectual natures, and probable states of existence in other worlds. The scene is the Colosseum in Rome, by moonlight. The most important truth inculcated is, that in the progress of society, no useful discovery is lost; all great and real improvements are perpetuated; and that in consequence the welfare of mankind is in continued progression.

The scene of the second dialogue is the summit of Vesuvius,—the subject, discussions connected with the vision in the Colosseum, on religion generally, and on the Christian religion in particular; in which Ambrosio, an enlightened and liberal Catholic, acts the part of the Christian advocate, 1st, defending the Mosaic account of the creation of man, as in strict harmony with reason, and accordant with all just metaphysical views of the human mind; 2dly, maintaining that man was created with a religious feeling, or instinct, or knowledge, as represented by Moses, which declining



with his fall, its place was supplied by Revelation, without which true religion must have become extinct on earth; and, 3dly, deriving Christianity from Judaism,—the same pure theism as that of the patriarchs, but spiritualised, and generalised, so as to be fit for all mankind; founding his creed rather on the fitness of its doctrines than upon historical evidences, or the nature of its miracles,—and repelling objections, derived from any apparent want of conformity in the doctrines of Christianity to the usual order of events, on “the principle that religion has nothing to do with the usual order of events.”—“It is,” he eloquently says, “a pure and Divine instinct, intended to give results to man which he cannot obtain by the common use of his reason, and which, at first view, often appear contradictory to it; but which, when examined by the most refined tests, and considered in the most extensive and profound relations, are, in fact, in conformity with the most exalted intellectual knowledge; so that, indeed, the results of pure reason ultimately become the same with those of faith. The tree of knowledge is grafted upon the tree of life; and that fruit which brought the fear of death into the world, budding on an immortal stock, becomes the fruit of the promise of immortality.”

The third dialogue is held at Pæstum. A character is introduced, called “The Unknown,” who takes the lead in the conversation; and, from circumstances connected with the locality, proceeds to general views of the geological structure of the earth, and of the revolutions or changes which our planet has undergone, deduced from actual observations on existing strata. From geology the conversation turns to religion; and “The Unknown” continues the defence of Christianity on the same ground as Ambrosio; stating how, from a

sceptic, which he was in his youth, he became a believer, from considering the intellectual faculties of brutes, compared with those of man, and by examining instinctive powers, which led him to the conclusion that revelation is to man in the place of instinct.

The same person appears in the fourth dialogue, which, as well as the two remaining, is held between him as the principal speaker, and Philalethes and Eubates. In the fourth, which is commenced at the falls of the Traun, in Styria, and concluded in the cavern of the Madelina, near Adelsburg, in Carniola, the conversation is partly relative to that singular animal the *Proteus anguinus*, partly on the subject of respiration and animal heat, and in part on the nature of the soul, and the destiny of man after death, in connection with belief in Christianity. In this last part, the main argument is upheld by "The Unknown," for the immateriality and consequent immortality of the soul, founded on the principle, or rather postulate, that sensibility and intelligence cannot result from any possible combination of any insensate unintelligent atoms.

The person called "The Unknown" appears in the fifth dialogue, in the character of a chemical philosopher, gives some account of himself; points out the importance of chemical science to society; describes what a true chemical philosopher ought to be; the qualities of mind and the studies requisite to form him; the method of promoting chemical science, and the spirit of philosophy in which it ought to be pursued.

The scene of the last dialogue is Pola, in Istria; and in it are discussed principally the effects of time, or the changes which take place on the surface of our globe from the action of the various causes to which

material forms are exposed. Such is a very slight outline of the work.

To me these dialogues are particularly interesting, from the circumstances under which they were written, and the time and manner in which they were concluded; from the deep interest he expressed in them himself when I read them to him during the height of his illness, and when he supposed he had not many hours to live; from his having bequeathed them to me in his will, and entrusted me with the publishing of them; and I may add also, from their nature and tendency as to doctrine, and the manner in which they display his character, as a poet, as a metaphysician, as a geologist, as a chemist, and as a Christian, and in each the philosopher, in the original, modest, and humble meaning of the word. As such he began his career; as such he terminated it; and as such, I trust his name will descend to posterity.

In the notice which I prefixed to the "Consolations in Travel," I thought it right to state that "the characters of the dialogue were intended to be ideal, at least in great part; and that the incidents introduced, as well as the persons, were to be received only as subordinate, and subservient to the sentiments and doctrines." Notwithstanding this warning, even some of my brother's friends, who were well acquainted with the general occurrences of his life, have been inclined to receive as real, circumstances which were entirely imaginary. One gentleman, a very old friend, who is mentioned in his will, told Dr. Babington, after reading the "Consolations in Travel," that in a journey which he had made lately through Southern Austria, he had stopped, and fished at the falls of the Traun, and had



heard of my brother's having been there; but was surprised that he heard nothing of the incident which in the fourth dialogue is described as having happened to Philalethes, or the author, viz. his being precipitated down the fall, and his being hooked up by an angler fishing below for hucho; and Dr. Babington asked me how that was, whether real or a fiction; and when I told him it was the latter, he further begged to be informed whether my brother had ever been in Palestine, its shore being introduced as the scene of a vision in the third dialogue. This was a very natural inquiry, as my brother had been so much abroad, and might have made (though he never did) a journey to Egypt and Syria, without its being generally known. As far as relates to scenery, I believe I may state that in the dialogues no other place is introduced excepting this—the site of the ancient Ptolemais, with which he was not personally and intimately acquainted.

On the persons of the dialogues a few remarks may be required, on those features of them which may be considered as rather taken from life than ideal.

The resemblance between Ambrosio and Monsignor Spada has already been alluded to. I hope this gentleman will not be displeased with the reflected character,—I am sure he will not be displeased with the warm zeal which animates Ambrosio's defence of the Christian religion. My brother, probably, made choice of a Roman Catholic for this duty, partly on account of the great political question then in agitation, and which at that time was so triumphantly carried,—I mean the Catholic question. In a letter to Lady Davy, written from his dictation, at Rome, just after his attack, and of which he gave me a copy, he expresses his delight on the occasion. He says, "I rejoice that the Catholic

question is carried: without having a strong political bias, I have always considered this point as essential to the welfare of England as a great country, and connected with her glory as a liberal, philosophical, and Christian country." And partly from a friendly feeling, which he had, in some respects, to the discipline and doctrines of the Roman Catholics. The obedience which this church requires, the submission of reason, the unlimited faith, he considered favourable to religious feeling, and the securest harbour for the unfortunate and afflicted; the strongest hold against *popular* schism, scepticism, and fanaticism; and in accordance with the faculties and wants of the human mind, especially as regarding its affections. On the latter point he expresses himself strongly in his diary, on the 14th of June, 1827, at Aussee, on occasion of that beautiful ceremony, the Fête Dieu. His words are, — "Struck with the affecting nature and superiority of the Catholic religion, which gives joy and comfort to the heart, by making a festivity and not a hard duty of worship, — it is the Fête Dieu." His views of the weakness and fallacy of reason on the subject of religion might have promoted a bias in his mind in favour of this church; and having travelled much in Roman Catholic countries, and witnessed the powerful influence which religion there has over the people, as regards habits of life and daily feelings, the bias might have been confirmed; and it must have been confirmed from seeing the positive civil and social advantages which it gives in comparison with the Protestant; its levelling, unaristocratic nature; its being no distinguisher of persons; its bringing all classes of people together, without distinction, in mixed worship, under the same roof; its throwing open the most splendid churches to the populace,

and allowing them to be made an asylum to the pauper;\* thus giving one kind of social liberty, that which is personal, in lieu of that which is legal, and which has generally been associated with Protestantism. But whilst he saw the advantages belonging to the Roman Catholic religion, he saw too the abuses to which it is liable, and which it had run into during its period of worldly prosperity. He himself, I believe, belonged to no church, excepting, in an enlarged sense, to the "Church of Christ," according to the declaration of "The Unknown" in the third dialogue, which there I consider his own.

In the description of the character of Eubathes in the fourth dialogue, there is a striking resemblance to his friend Dr. Wollaston, whose health had been declining before the dialogues were commenced, and who died, as we have seen, before they were finished. Secretaries of the Royal Societies for many years together, a kind of generous rivalry had existed between them; and a volume of the Philosophical Transactions rarely appeared without contributions from both, conducive to the advancement of science. Dr. Thomas Young, during the same period, was Foreign Secretary. All

\* An Englishman returning from Italy, where he has been accustomed to see the most splendid churches open to the public for devotion, without distinction of rank or any exception, is necessarily pained, on visiting the great churches of our metropolis, to find their doors closed against him, and that he must pay to see them. In the former, the free access encourages devotion; probably, many who have entered from curiosity have had a better feeling excited, and have remained to pray. In the latter—our churches,—the angry feelings of the casual visitor, I apprehend, are oftener roused at the mercenary manner in which fees are exacted. Who can say that the shut-up state of Westminster Abbey is not disgraceful to England, both considered as a place of public worship and a receptacle of monuments erected by a grateful country to her distinguished men?



three were Foreign Associates of the first class of the Institute of France.\* Their deaths during the same year form a remarkable coincidence; and I am disposed to think that my brother had some mysterious feeling on the subject, that as there had been a kind of conjunction in life, so there was to be in death.

In *Philalethes* the author is supposed to speak in his own person, and may be considered as showing the progress of his own mind in relation to certain doctrines, metaphysical and religious, which are inculcated; but not even this in an absolute manner, and without exception. In giving an outline of the incidents of *Philalethes*' life, he must have had in view his own; their journeys were the same; their valetudinary state the same; and his feelings were those so forcibly, and so mournfully and poetically given, in comparing the early career of *Philalethes*, and the enjoyments which London then afforded him, with his latter condition, when youth and health were gone, and when even ambition had lost its power over him, and in beautiful nature alone he found amusement from ennui, and unceasing charms. And the identity of *Philalethes* and the author is strengthened by the vision ascribed to the former in the first dialogue, and the dream in the second.

It may be supposed that the vision, as *Ambrosio* considered it, was a mere fiction—a poetical epitome of his philosophical opinions. But it was not exactly so. He says, — “The most important parts of it really occurred to me in sleep, particularly that in which I seemed to leave the earth, and launch into the infinity of space, under the guidance of a tutelary genius. And the origin and progress of civil society form likewise

\* As the number is limited to eight, the honour is the greatest that can be conferred on a man of science.

parts of another dream which I had many years ago; and it was in the reverie which happened when you quitted me in the Colosseum, that I wove all these thoughts together, and gave them in the form in which I narrated them to you." And in confirmation of this, in one of his note-books, there occurs a partial sketch of the two dreams, one of which he calls "a day dream." As the foundation of this singular vision, I shall extract the notice verbatim:—

"*Rome, November 9, 1819.* — One moonlight night, when the summer seemed to pass into the autumn, and the zephyr blew as mildly as in June, I was walking in the Colosseum full of sublime thoughts, considering the loss of the Greek and Roman superstition, and comparing it with the beadsman's worship in the midst of this sublime pile of ruins; when of a sudden I saw a bright mist in one of the arcades, so luminous that I thought a person must be advancing with a light. I approached towards it, when suddenly it enveloped me; an aromatic smell, like that of fresh orange flowers, seemed to penetrate not only into my nostrils, but even into my respiratory organs, accompanied with sweet sounds, so low that they seemed almost ideal; and a sort of halo, of intense brilliancy, and of all the hues of the rainbow, above which appeared a female form of exquisite beauty. I was not alarmed, but rather delighted, at the new kind of ideal or sensual existence I experienced, when a voice, distinct, but like that of a flute, said, 'I am one of the Roman deities! You disbelieve all the ancient opinions, as dreams and fables; nevertheless they are founded in truth. Before the existence of man, and some time after, a race of beings who are independent of respiration and air occasionally dwelt on the globe,—the people of that assemblage of

stars called the milky way; but now your atmosphere is so gross we do not often visit you. We find the same difficulty in moving in your air that a bird experiences in attempting to use its wings in water. Our organized matter is infinitely more subtile than yours: when your planet was warmer, we occasionally dwelt with you. We have the power of arranging vapours and mists, and the matter that refracts light, so as to assume almost any form we like; and we purify the common elements for our purposes. In the early stage of society we condescended to instruct man, a rude and gross race, and give them some of our knowledge. A day is sufficient for us to learn your language. I have acquired it in hearing three or four of your countrymen converse, and in reading one of your books. I am the most corporeal of all those beings; and an expenditure of common matter, in a flight which I made from Sirius to a star you call Alpha Lyra, induced me to pay a visit to the earth for the purpose of recruiting myself. The last time I was here——” Here the MS. terminates abruptly; and then immediately follows a notice of the other dream. He says, “I had on the 7th April, 1821, a very curious dream, which, because it has some analogy to the preceding *day dream*, I shall detail:—

“In the first part of the night my dreams were rather disagreeable, as well as I can recollect. It must have been considerably after midnight, when I imagined myself in a place partially illuminated with a reddish hazy light; within, it was dark and obscure; but without, and opening upon the sky, very bright. I experienced a new kind of sensation, which it is impossible to describe. It seemed as if I became diffused in the atmosphere, and had a general sense of balmy warmth. Floating a little while in the atmosphere, I found that I



had wings. Slowly, and with some difficulty, I rose in the air; and gradually ascending above the cave or recess in which was the red light, I found myself in the sky, amidst bright clouds and galaxies of light. It seemed as if I was altogether entering a new state of existence. I, for some time, reposed upon the highest of these galaxies, and saw as it were the immensity of space,—systems of suns and worlds, forming a sort of abyss of light, into which I seemed doubtful whether I should plunge. At this moment I seemed in communication with some intelligent being, to whom I stated, that I had always been of opinion that the spirit is eternal, and in a state of progression from one existence to another more perfect; that I had just left a world where all was dark, cold, gross, and heavy; that I now knew what it was to have a purer and better existence, but that I hoped for something still more perfect; that I was now in natural warmth, light, and ether; and that I hoped to be, ultimately, in a world of intellectual light, where the causes of all things would be developed, and where the sources of pleasure would be unbounded knowledge. After this, my dream became confused; my fields of light changed to a sort of luminous wood filled with paths, and the bright vision degenerated into a common dream.”

The dream or vision of Philalethes I have alluded to in the second dialogue, may be dismissed with very brief notice. It occurred to my brother in the delirium of the feverish attack which he had, and which so nearly proved fatal to him, in the beginning of the winter of 1807; and, as he imagined, related to and was the image of the young person who twenty-one years after became his kind nurse in a remote part of Europe, and was of essential use to him in that capacity. Throughout

life, I may observe, he was very subject in sleep to dream, and especially in early life, when his dreams were frequently of a very vivid and often terrific kind, and sometimes connected with his walking in his sleep. Notice of dreams is not unfrequent amongst his memoranda; even as late as 1825 he gives an account of one, which I shall introduce, as it is as remarkable for the reasoning power displayed in it as the others already given are for wildness of imagination. It is dated the 2nd of April, and is as follows:—

“Last night, at Holme, slept in a bed full of fleas, yet my dreams were agreeable and full of intelligence. I thought I was arguing with a sceptic, who I believe was \* \* \*. I said, ‘Consider this world, all that we know of the universe; everything is arranged in a manner which places chance at defiance. If all the planets and their satellites in their relation to the sun observe fixed laws, which, as far as we can conceive by analogy, are the same as those belonging to our earth, where everything is intended to produce perpetual life, it is a million to one that such combinations, which are, according to our analogies, intelligent, should be produced by accident.’ \* \* \* ‘Well, but how an intelligent cause? what can you know of this? It may be a spirit, a principle, an energy; it is nothing we can grasp or understand.’ I replied ‘No; there is an intelligent cause, which is *God*. You cannot know or understand the Creator, the Infinite, the Divine Eternal Mind; but you may wonder at its powers, adore its everlasting mercy, and be grateful for its unceasing goodness.’”

At no period of his life did he entirely disregard dreams; he remembered more of them than is usual, but chiefly as phenomena of mind, though occasionally

he may have indulged in the idea that their source was on high, according to the old Homeric notion, and given for forewarning.

“*The Unknown*,” who stands so prominently out in the latter dialogues, by many readers may be received as a portrait of himself in a picturesque disguise of dress and situation. If Philalethes may be considered as representing him in ordinary life, as what he was, it may be supposed that “*The Unknown*” was intended to represent what he wished to be, and that he was designed as the beau ideal of the chemical philosopher whose character he delineates. I remember, when reading to my brother during his illness the account which *The Unknown* gives of himself at the opening of the fifth dialogue, being struck with the resemblance and mentioning it to him; but he would not allow that the prototype of the character was himself. However, independent of his dress and some of the incidents of his life, he *was* essentially the prototype, in sentiments, feelings, opinions, doctrines,—in brief, in mind; and their origin and their general course of life were very similar, and with some exceptions, too, their course of travel. The religious sentiments *The Unknown* expresses, and his metaphysical doctrines, were, I believe, entirely my brother’s own—the last results of his mature studies. The reader will perceive that they are much the same as those which have been already given; proving how deliberately they had been formed, and how, for a number of years, the subjects had had his consideration. This resemblance I have already pointed out. It is most remarkable in the original argument, which he uses in favour of natural religion,—that *religion* is *instinct*, and that revelation is given to supply the place of this early intuitive know-



ledge or instinctive feeling; an argument which appears well adapted to such minds as those to whom *religion* is not *habit*, and to whom *analogy* is not *demonstration*, and whom reasoning has led to scepticism or infidelity.

Had he lived, I have no doubt he would have altered very considerably, and have added to these dialogues, agreeably to the intention which he expressed in one of his last letters already given. Though the subjects discussed had had his consideration for many years, and he brought to bear on them an accumulated stock of knowledge and poetical ideas,—with the exception of two of the dialogues, they were all rapidly written, and his plan for them was hardly matured. In a note in pencil, written in his journal just before his last attack, and when the sixth dialogue was not finished, he says, “I think I shall conclude with a vision of Eubathes, or with a meeting of the four friends, and a vision of Ambrosio. Whichever plan, I shall introduce the punishment of the bad, *retribution*; and the idea of the punishment of the wicked in the passions outliving the organs; the rewards of the good in pure intellectual enjoyments. How transient, even from their nature, are all sensual pleasures! Even the appetite, when satisfied, produces satiety.” And there occurs a fragment of a sketch of what was probably intended for such a vision, in illustration of the punishment of the wicked;—a portion of which I shall introduce:—

\* \* \* \* \*

“My time has been passed between long sleep without sense, sleep with terrible dreams, and more dreadful waking thoughts. This is the nature of my punishment,—the punishment of those souls who have avoided the sympathies of human nature and sacrificed every

thing to selfishness. They have all the desires of their mortal life, without any of the powers of gratifying them. They are everlastingly tormented by a vain and burning desire; they see objects which they wish to grasp, but they have no hands; objects of beauty floating before them in the air, but they have no wings to reach them; they have ardent desire to converse, but they have no tongues; they see lips moving, but they have no ears; the volume of nature is open before them, but so distant that they are unable to read it; they are burning, and the cool stream is beneath them, but they have no feet to reach it; the eye, the most glorious of all senses, is their organ of punishment. It is revealed to me that moons, which roll round the planets, are the places of expiation for offending spirits; and that the consummation of all things will be, when the moons rush to the planets, the planets to their suns, the suns to one great centre—when all will be light and joy, and all matter animated by one pure and undivided breath of Omnipotence.”

I have said that all the dialogues were rapidly written excepting two, and these were the fifth and sixth, the greater part of which had been composed previously some few years, and were intended to have formed a portion of a series of dialogues on chemical philosophy; but which, though some other portions of them were composed, were never completed.

I have now given almost all the information I have been able to collect respecting the “*Consolations in Travel*,” his “*Legacy to the Philosophical World*.” In the letter to Lady Davy already referred to, written during his illness, in which he thus bequeaths these dialogues, after mentioning the precautions he had taken to preserve them, he adds, “I should not take so

much interest in these works, did I not believe that they contain certain truths which cannot be recovered if they are lost, and which I am convinced will be extremely useful both to the moral and intellectual world. I may be mistaken in this point; yet it is the conviction of a man perfectly sane in all the intellectual faculties, and looking into futurity with the prophetic aspirations belonging to the last moments of existence." This was written from his dictation when he supposed himself dying. I trust he was not deceived in the estimate he made of the importance of this work; I trust it will be a beacon light to young and erring genius; that it will serve as a stimulus to good pursuits and to intellectual exertion; that it will tend to uphold the dignity of science, and protect the purity of scientific glory; and that in religion it will give encouragement to timid minds not to yield to the irony and scoffs of the gross materialist and atheist; that it will make scepticism less plausible, and that it will impart ardent hopes and the desire of a holy faith.

In regard to distinguished men, every thing belonging to them acquires an interest; even trifling circumstances. We are desirous of knowing their form of body, expression of countenance, tone of voice, and manner of speaking; their mode of dress; and, in brief, all minute particulars, that we may form for ourselves as complete a picture as possible of them. Whilst the recollection of my brother as he was in his best days is still fresh in my mind, I shall record it, trusting that such a record will not be unacceptable, and believing that he belongs to that class of men of whom it is required, at least by posterity.

He was of middle stature, about five feet seven inches high; but appeared shorter, perhaps from the just



proportions and symmetry of his make. His hands and feet were small, and his bones in general small; but his muscles were comparatively large, especially of the lower extremities, in consequence of which he was well adapted for those exercises and sports of the field and river in which he delighted. He could walk well, and bear fatigue for a long time; his arms and shoulders were, he used to say, less able than his legs; yet their strength was perfectly adequate to the management of the salmon rod, and the laborious amusement of salmon fishing; and there were few anglers who could throw the fly further on the water, or with greater steadiness and delicate precision; and he was quick in the use of his gun, and amongst good shots a very tolerable one, especially in that kind of shooting which requires an active hand and eye, as snipe shooting. His chest was well formed and rather ample, and his breathing perfectly good, and he was a good swimmer; yet in early life, as noticed by himself in his "Researches," his respiration was unusually rapid, twenty-six in the minute, which is about six above the average; people in health generally making twenty respirations in the minute. As he grew older this quickness of breathing diminished; and latterly I believe it was rather slower than is usual.

His neck was rather long and slender: his head was rather small, its surface smooth and rounded, without any striking protuberances; the occipital part was small, the forehead ample and elevated, and very beautifully rising, wide and gently arched. His face was oval, and rather small; but, owing to the expansion of forehead, not apparently so. His features were not perfectly regular; the nose aquiline, and broad at its base; the mouth rather large, the under lip prominent

and full; the teeth not large, but irregular; his eyes were light hazle, and well formed; his hair and eyebrows were also light brown; the latter were scanty, the former abundant, and very fine and glossy, with a tendency to curl. I remember once a gentleman speaking to me about it, and expressing his admiration of its quality, very much in the manner he might use in speaking of a lady's hair. His skin was delicate, and his complexion fair, with a good deal of colour. His countenance was very expressive, and responsive to the feelings of his mind; and when these were agreeable, it was eminently pleasing, I might say beautiful, for his smile was so; and his eyes were wonderfully bright, and seemed almost to emit a soft light when animated. His voice was full-toned and melodious, with something in it which impressed his hearers, and made it remembered; indeed, I have heard a lady, who resided in a distant part of the country, and who never saw him, remark, that she hardly ever remembered his name being mentioned without some notice of his voice being made. It was particularly well adapted to express feeling, that kind which was predominant in him,—the high and poetical,—and equally well adapted to convey tenderness and kindness. Without a musical ear, or a quick perception of the difference of sounds, he had studied its intonation carefully, and had so acquired a manner which a person with a fastidious taste for music might find fault with, and yet was very agreeable to a mixed audience. I recollect at the first anniversary dinner of the Royal Society, at which he appeared in his capacity of President, after the cloth was removed, and he had addressed the company in a speech which was extremely well received, the gentleman who sat next me (and who was not aware that I was his brother),

turned to me and said, he was sure the President was not musical; that his voice was very fine, but it was deficient in just musical modulation.\* The person who made this remark was, I believe, an amateur musician, and a distinguished critic in the science of sounds. His senses generally were acute, and well fitted for active life, and the successful pursuit of physical science, in which they are the messengers of information, and unless quick and accurate, may retard and lead astray even the most correct and penetrating minds.

He had a fine and lively perception of the beautiful in nature and art,—of his fondness for nature,—(in its best and most comprehensive meaning,—the poets' and philosophers' external world,—

“ Of all that we behold  
From this green earth; of all the mighty world  
Of eye and ear, both what they half create,  
And what perceive,†)

—proofs innumerable have already been given. His fondness for art, was less declared and had never been particularly cultivated;—yet, I believe the fine arts were to him a source of pleasure; and that he had a great admiration of the noblest works of art. In the last journal which he kept at Rome, is the following entry:—“ January 24th, 1829, went yesterday to the Museum and admired the glorious works of old Greece, the Apollo and the Laocoon.” When a boy, it has been mentioned, he was fond of drawing: many of his

\* When I recall to mind, the tones of his voice, and its influence, I am almost disposed to adopt the opinion current in the time of Roger Bacon, who in his letter “ *De secretis operibus artis et naturæ, et de nullitate magiæ*,” says “ *Non immerito dicitur quod vox viva magnam habet virtutem.*”

† Wordsworth,—his immortal poem,—“ *Tintern Abbey.*”





Dec 22<sup>d</sup>.

My dear Mother

My sister's letter of the evening gave me very sincere grief. I have long been afraid that my dear child would not recover. But from John's account, I still had hopes of seeing her again, although there hopes are gone: but I trust her excellent & worthy woman is enjoying a new prospect of happiness than belongs to this chequered & uncertain life. - I beg you will give my kindest love to my dear Aunt Eliza & thank my dear concern she has ill-deep! -

I shall inclose a £10 note which I beg you will lay out in the way you think best, for my sister's children & my old passives that know as in your case. But I believe they are ch. gone, save the stream of time. -

I thank you for your representation of my election. to the highest education a female can give - I hope it will increase my dear sister's worth to my fellow creatures & my country. I am my dear Mother's

very sincere son

\* The Anns alluded to were Mrs. mother's sisters. In my former Memoir, it was inadvertently stated, that Mrs. mother was the youngest of the three; - she was the second

J. Dary

early drawings have been kept;—they are chiefly landscapes,—some of the most striking scenes in the Mont's Bay, especially those poetical ones, St. Michael's Mount, and Kinance Cove. And always afterwards, in travelling he made more or less use of the pencil in sketching rapidly, what particularly impressed him, —whether an object of natural history, as the hucho of the Danube,—a geological feature,—or an impressive mountain-groupe. Of his handwriting, the annexed *fac simile* of a letter written in December, 1820, shortly after his first election, as President of the Royal Society, and in reply to melancholy intelligence, may serve as an example; it is a fair instance of his current hand; and equally, I may add, of his kindly feelings and of the tone of his mind.

His temperament was what is commonly called the sanguine, in which there is a tendency to excess of sensibility and irritability, and of vital action, combined with corresponding activity of mind, and a certain warmth and impetuosity of temper. A warmth of feeling and of action was essentially his, and marked almost all his doings and sayings. In his pursuits he was ardent and zealously persevering, stimulated by difficulties to exertion, and delighting to exercise the power he was conscious he possessed of overcoming difficulties, and as much in the ordinary affairs of life, and in shooting or fishing, as in matters of the greatest moment and of a scientific nature. The spring and elasticity of his mind was extraordinary. No misfortune could depress it long when he was in health, or, indeed, when suffering under disease. He considered yielding weakness, and always resisted it, either by an effort of mind, or by change of pursuit or scene. This firmness of purpose and exertion was very remarkably shown during



his long illness. He always strove and attempted to make head against it, trying various remedies, consulting successively different physicians, using different kinds of diet, shifting his abode from the north to the south, according to the seasons and his sensations. Persons who did not comprehend his mind and temperament might misinterpret many of his actions, and especially while he was in a valetudinary state, and attribute almost to derangement of intellect what was the result of activity of mind and unyielding disposition; as his exercising himself not only in walking, but occasionally in running, when he was struggling with a paralytic affection of his right leg, on the idea that the muscles might probably recover their tone by exercise; and in his continuing to shoot and fish at a time when most men would have been confined to their rooms; and in prosecuting his scientific pursuits and literary labours even during dangerous illness, and when he supposed he had only a few hours to live. Many proofs of this have been already given, especially how he occupied and amused himself in illness. I may notice another instance of the same kind, which I have just turned to in looking over his note books, written from his dictation on the 28th of February, when he supposed his earthly career nearly run, a few days after his last paralytic attack; and I am the more tempted to give it, as it relates to the mind of an individual of whom he had a very high opinion, the late Dr. Jenner, and to a topic, humble indeed in itself, yet aptly showing, perhaps, the most remarkable features of Dr. Jenner's mind, great power of observation, and quickness of analogical application. My brother's words are:—

“I remember, in 1809, having had a long conversation with the late Dr. Jenner, on the habits of animals.

He was always original and ingenious, but I think was sometimes carried too far by the remoteness of his analogies. We were discussing the possibility of the uses of earthworms to man. I was more disposed to consider the dunghill and putrefaction as useful to the worm, rather than the worm as an agent important to man in the economy of nature; but Dr. Jenner would not allow my reason. He said the earthworms, particularly about the time of the vernal equinox, move much under and along the surface of our moist meadow lands, and wherever they move they leave a train of mucus behind them, which becomes a manure to the plant. In this respect they act as the slug does in furnishing materials for food to the vegetable kingdom; and under the surface, they break stiff clods in pieces, and finely divide the soil. They feed likewise entirely on inorganic matter, and are rather the scavengers than the tyrants of the vegetable system."

He was warm and disinterested in his friendships, and delighted in cultivating them. Fashion did not attract him, nor rank, nor even genius and knowledge, so much as goodness of heart, and simplicity of mind, and steady worth of character. His oldest and dearest friends were thus distinguished:—"Nisi in bonis amicitiam esse non posse," was the sentiment of his early youth, as expressed in a fragment of an essay on friendship, given in the commencement of this work; and sure I am, that it was experienced through life. His opinion relative to temper in the marriage state, from which it is applicable to friendship generally, is thus forcibly expressed:—

"Upon points of affection it is only for the parties themselves to form just opinions of what is really necessary, to ensure the felicity of the marriage state. Riches

appear to me not at all necessary ; but competence, I think, is ; and after this more depends upon the *temper* of the individual than upon personal, or even intellectual circumstances. The finest spirits, the most exquisite wines, the nectars and ambrosias of modern tables, will be all spoilt by a few drops of bitter extract ; and a bad temper has the same effect in life, which is made up, not of great sacrifices or duties, but of little things, in which smiles and kindness, and small obligations given habitually, are what win and preserve the heart, and secure comfort.”

I shall introduce here a copy of a letter from him to the late Mr. Coleridge, without date, but supposed to have been written in 1802 or 1803, for which I am indebted to their common friend, Mr. Wordsworth. It will be acceptable, I trust, to the reader, in relation equally to the character of my brother and his distinguished friend, and as an example of the lofty and enthusiastic feeling of friendship of one man of genius towards another, as well as of that kind of exhortation which a man of genius alone could offer and receive :—

“ Twelve o’clock, Monday.

“ MY DEAR COLERIDGE,

“ My mind is disturbed, and my body harassed by many labours ; yet I cannot suffer you to depart, without endeavouring to express to you some of the unbroken and higher feelings of my spirit, which have you at once for their cause and object.

“ Years have passed away since we first met ; and your presence, and recollections with regard to you, have afforded me continued sources of enjoyment.



Some of the better feelings of my nature have been elevated by your converse; and thoughts which you have nursed have been to me an eternal source of consolation.

“In whatever part of the world you are, you will often live with me, not as a fleeting idea, but as a recollection possessed of creative energy,—as an imagination winged with fire, inspiring and rejoicing.

“You must not live much longer without giving to all men the proof of power, which those who know you feel in admiration. Perhaps, at a distance from the applauding and censuring murmurs of the world, you will be best able to execute those great works which are justly expected from you: you are to be the historian of the philosophy of feeling. Do not in any way dissipate your noble nature! Do not give up your birthright!

“May you soon recover perfect health,—the health of strength and happiness! May you soon return to us, confirmed in all the powers essential to the exertion of genius! You were born for your country, and your native land must be the scene of your activity. I shall expect the time when your spirit, bursting through the clouds of ill health, will appear to all men, not as an uncertain and brilliant flame, but as a fair and permanent light, fixed, though constantly in motion, as a sun which gives its fire, not only to its attendant planets, but which sends beams from all its parts into all worlds.

“May blessings attend you, my dear friend! Do not forget me: we live for different ends, and with different habits and pursuits; but our feelings with regard to each other have, I believe, never altered. They must continue; they can have no natural death; and,

I trust, they can never be destroyed by fortune, chance, or accident.

“H. DAVY.”

This letter had written on its back, by Mr. Coleridge, “This from Davy, the great chemist. It is an affectionate letter.”

I am tempted to give another letter to Mr. Coleridge, for which I am also indebted to Mr. Wordsworth, relating to the death of Dr. Beddoes, and strongly descriptive of deep friendly interest. Well do I remember the time when he received the letter communicating the death of Dr. Beddoes, referred to in his letter to Coleridge. He was occupied at the instant in a very interesting chemical inquiry; he stopped,—read the letter,—exclaimed, with a burst of grief, “Poor Beddoes is no more!” And then resumed the experiment,—by an effort suppressing his emotion, strongly indicated by tears:—

“December 27, 1808.

“Alas! poor Beddoes is dead! He died on Christmas eve. He wrote to me two letters on two successive days, 22nd and 23rd. From the first, which was full of affection, and new feeling, I anticipated his state. He is gone at the moment when his mind was purified and exalted for noble affections and great works.

“My heart is heavy. I would talk to you of your own plans, which I shall endeavour in every way to promote; I would talk to you of my own labours, which have been incessant since I saw you, and not without result; but I am interrupted by very melan-

choly feelings, which, when you see this, I know you will partake of.

“Ever, my dear Coleridge,

“Very affectionately yours,

“H. DAVY.”

And, another, on the death of his earliest and most highly valued friend Mr. Gregory Watt, written just after the event in 1804, addressed to their common friend, Mr. Clayfield:—

“I scarcely dare to write upon the subject. I would fain do what Hamlet does when, in awe and horror at the ghost of his father, he attempts to call up the ludicrous feeling; but, being unable to do so, he merely employs the words which are connected with it. I would be gay, or, I would write gaily, in alluding to the loss we have both sustained; but I feel that it is impossible. Poor Watt! He ought not to have died. I could not persuade myself that he would die; and until the very moment when I was assured of his fate, I would not believe he was in any danger.

“His letters to me only three or four months ago were full of spirit, and spoke not of any infirmity of body, but of an increased strength of mind. Why is this in the order of nature, that there is such a difference in the duration, and destruction of her works? If the mere stone decays, it is to produce a soil which is capable of nourishing the moss and the lichen; when the moss and the lichen die, and decompose, they produce a mould, which becomes the bed of life to grasses, and to more exalted species of vegetables. Vegetables are the food of animals; the less perfect animals of the more perfect; but in man the faculties and intellect are



perfected. He rises, exists for a little while in disease and misery ; and then would seem to disappear, without an end, and without producing any effect.

“ We are deceived, my dear Clayfield, if we suppose that the human being, who has formed himself for action, but who has been unable to act, is lost in the mass of being ; there is some arrangement of things which we can never comprehend, but in which his faculties will be applied.

“ The caterpillar, in being converted into an inert scaly mass, does not appear to be fitting itself for an inhabitant of air, and can have no consciousness of the brilliancy of its future being. We are masters of the earth ; but, perhaps, we are the slaves of some great and unknown beings. The fly that we crush with our finger, or feed with our viands, has no knowledge of man, and no consciousness of his superiority. We suppose that we are acquainted with matter, and with all its elements ; and yet we cannot even guess at the cause of electricity, or explain the laws of the formation of the stones which fall from meteors. There may be beings, thinking beings, near us, surrounding us, which we do not perceive, which we can never imagine. We know very little ; but, in my opinion, we know enough to hope for the immortality, *the individual immortality of the better part of man.*

“ I have been led into all this speculation, which you may well think wild, in reflecting upon the fate of Gregory ! my feeling has given erring wings to my mind. He was a noble fellow, and would have been a great man. Oh ! there was no reason for his dying—he ought not to have died.

“ Blessings wait on you, my good fellow ! Pray, remember me to Tobin ; and, if you read this letter to

him, protest the moment he begins to argue against the immortality of man."

It has been said that rank had an undue influence over his mind, and that he courted too much the great; I believe in this there was a mistake. In fact, the great (using the word in its popular sense) courted him, and paid him latterly more attention than many of his earlier acquaintances, on whose friendship he had more claims. His independence, and little attention to the great in the way of courting their favour, are strongly marked in the dedications of his works. His earliest production, his "Essays on Heat and Light," were dedicated to Dr. Beddoes, and to the subscribers of the Pneumatic Institution, of which he was superintendent; his next work, his "Researches," was sent into the world without a dedication; his next, "A Syllabus of a Course of Lectures delivered at the Royal Institution," was dedicated to the managers of that establishment; his next, "Elements of Agricultural Chemistry," to his friend Mr. Knight;\* the next, "Elements of Chemical Philosophy," to Lady Davy, immediately on his marriage. His "Discourses to the Royal Society," which were published at the request of the Council and many of the Fellows, were dedicated to them; his two last works, his "Days of Fly Fishing," and "Consolations in Travel," to two private friends, and on the score solely of friendship and kind feeling; "Salmonia" to Dr. Babington, "in remembrance of some delightful days passed in his society, and in gratitude for an uninterrupted friendship of a quarter of a century;" and the "Consolations in Travel" to Mr. Poole, "in remem-

\* The last edition was dedicated to this distinguished Physiologist; the earlier ones to the President and Members of the Board of Agriculture.

brance of thirty years of continued and faithful friendship."

That he was much amongst persons of high rank is not surprising, considering how his society was sought; the attractions which belong to their best circles; the graces, and courtesies, and refinements which distinguish them, as well as the superiority of mind and of information which is usually to be met with in them.

Throughout life he carefully maintained his independence, and preferred rather conferring than receiving obligations: he certainly conferred greatly more than he received. This he knew, and he felt accordingly. He was delicately averse from, and fastidious about, asking favours, even for his friends, and of government, for which he frequently worked without emolument, and too often almost without thanks, public bodies being proverbially ungrateful. Nor was he at all of a mercenary disposition, of which he gave many proofs, combined with disinterested attachment and devotion to science.

I have mentioned already how he declined certain invitations to enter the church, with the assurance of the strongest support. I have mentioned also, that though he had every reason to expect eminent success in practice as a physician in London, yet considering the sacrifice of his tastes which he should be obliged to make, this plan, too, of a golden fortune he soon relinquished. I have mentioned further, that though often urged to take out patents for discoveries which he had made, and especially for the safety lamp, he never yielded for a moment to these solicitations, considering such practices unworthy of a man of science. Nor was he prodigal of expense, or parsimonious; but lived very much according to his means, using a just economy.



In politics, as in science, he adopted the motto of the Royal Society, "*nullius in verba*;" he followed no leader and belonged to no party; he declared of himself he "had no strong political bias;" he kept himself free to entertain such views as appeared to him best warranted by facts and circumstances. And yet he was not lukewarm in politics, nor wavering in principles; his principles were those of constitutional liberty, to which he was devotedly attached, from firm conviction, that true national prosperity depends on it. "*Quid est enim civitas, nisi juris societas?*" It has been said of him,—if a newspaper report be true, and that by Mr. Warburton in the House of Commons,—that he was "a great Tory."\* Surely this was a mistake, receiving the term in its present common acceptance. In his last work in his "Consolations in Travel" in the sketch he there gives of the passages of time and the progress of society, he observes, "In the common history of the world as compiled by authors in general almost all the great changes of nations are confounded with changes in their dynasties, and events are usually referred either to sovereigns, chiefs, heroes, or their armies, which do in fact originate from entirely different causes, either of an intellectual or moral nature. Governments depend far more than is generally supposed upon the opinion of the people and the spirit of the age and nation." And, in another place, in the same Dialogue, pointing out Britain as pre-eminent amongst nations, he holds this her superiority to be durable only whilst favourable to the liberty of mankind. His words are, "Amongst the rival nations that may be considered as forming the republic of modern Europe, you will see one pre-

\* "Morning Chronicle," February 12, 1836.

eminent for her maritime strength, and colonial and commercial enterprise, and you will find she retains her superiority only because it is favourable to the liberty of mankind." In his last illness, when he considered himself on his death bed, he advocated the cause of Catholic Emancipation;—his words on the subject were even quoted in the House of Commons by Sir James Mackintosh, and no one rejoiced more when the Catholic question was carried. This was not the conduct nor were these the opinions of a great Tory! but rather those of a dispassionate philosophical politician, keeping aloof from the struggling arena of parties. All his views of society, founded on his views of the human mind,—its faculties, aspirations and enjoyments, its capacity for progressive improvement,—its incapacity to be stationary without deteriorating, were incompatible with the opinion expressed of him, of his being "a great Tory," "a stationary Tory," fearful of all change,—associating reform with revolution,—and believing that change and reform, safety, moderation, and improvement are incongruous. And the same views might have made him averse to radicalism, or low democracy,—believing that intellect should preponderate in Government,—and that the higher faculties of the mind belong rather to the few than to the many; and least of all to the uneducated.

In disposition he was eminently social and cheerful, when in health delighting in society, and always well received, from his powers of pleasing, and amusing, and instructing, under the guise of agreeable conversation. In relation to company, he was not fastidious in taste; when he had choice, he preferred that which is commonly pronounced the best, and which is rarely to be found, except dispersed, out of London—the distinguished men of science and literature of the day; but

rather than be long alone, he had no objection to common-place persons, especially if strangers, and he seldom failed to entertain them, and to leave on their minds a strong impression of talent. I remember hearing of two young officers who accidentally fell in with him on the river side when angling, and spent the evening with him at an adjoining inn, where they stopped for the night. They found their chance companion so singularly amusing, and such “a very good fellow;” so copious in good stories; so knowing in the art of angling and in all things relating to rivers and fish, and to the gun as well as to the rod,—that their curiosity was excited to inquire of the landlord who he was; and their surprise was great on being informed that he was the President of the Royal Society. He carried into company an animation and a desire to please, the exertion of which required considerable effort, and was consequently incompatible with a weak state of health; and therefore when his health failed him, this was one of his motives for going abroad; for he knew that if he remained at home it would be difficult to refrain from society entirely, and that if he indulged in it at all he should over-exert himself. I recollect an instance in point. Soon after we had arrived at Ravenna, and were established in the apartments which the Vice-Legate was so obliging as to offer us in his palace, he received a visit from Monsignor Spada Medici, and conversed with him with a degree of animation and energy that surprised and rather alarmed me. When the Vice-Legate had taken his leave, I spoke to him of the manner in which he had exerted himself, expressing uneasiness as to its effect on his health. This he did not deny; yet at the same time he seemed to consider it as absolutely necessary that he should have so exerted himself. “What!” he



said, "could I sit like a stock or a stone, instead of endeavouring to entertain my visitor?" He was fond of sustained conversation, and when warmed was apt to speak at some length, and to deliver his sentiments as they flowed sparkling from his fancy, and often with a rich profusion of imagery; thus having an oratorical and poetical character, but always of a manly kind, and free from all puerilities and forced efforts at shining.

He was kind and courteous in the intercourse of life; and that naturally from a disposition to promote the happiness of others,—rather than from artificial breeding, and the observance of the mere rules of polished society,—though these he could not but respect. His servants were warmly attached to him; especially the servants of the Royal Institution, who, whilst they loved him, respected him. The late respectable housekeeper of the establishment, Mrs. Greenwood, if I might judge from her manner of speaking of him after his death, almost adored him. If he ever appeared wanting in kindness and courtesy, I believe it was not without ground, or unprovoked, and might be easily accounted for in every particular instance in which it appeared.

He was convivial in his habits, and curious in the qualities of meats and wines; yet in the latter he was temperate. He preferred the lighter kinds, the French, and very rarely indeed committed any excess in their use. Drunkenness he considered a disgusting condition, and I never saw him in it. If I recollect rightly, he told me he had been only once drunk, and that was when a very young man.

In dress he was rather careless, especially latterly; consulting more health and comfort than fashion and appearance. Before the present undress of gentlemen came into vogue, after the termination of the war, short

breeches, black silk stockings, a blue coat, and a white waistcoat, and white neckcloth,—the common costume of the time,—was his usual attire; but he retained it no longer than it was common. He was fond of broad-brimmed hats, as they afford protection from the sun and rain, and he generally wore one in travelling. I remember his wearing one of very moderate dimensions when he came to Edinburgh in 1811, soon after his marriage, at the time I was studying there; and in walking through Princess-street it attracted the impertinent notice and remark of some young men who were following us. At that time there was so little intercourse with foreigners, and dress was so uniform, that any small innovation was considered a great peculiarity.

He sat several times, and to different artists, for his portrait. Of the four which I have seen, and which I shall mention, the earliest, by Mr. Howard, from which the engraving prefixed to the former Memoir of his Life was taken, was done soon after he became professor of chemistry, when he was about twenty-three years of age. It was in the possession of his friend Mr. Poole, and I have the good fortune to have a copy of it, made by the original artist. I shall here transcribe a portion of a letter from Mr. Poole to me, alluding to this picture, and which was very characteristic of his feelings towards my brother; written on the occasion of his receiving from me a copy of the “Consolations in Travel,” which was dedicated to him:—

“Nether Stowey, Jan. 27, 1830.

“MY DEAR SIR,

“For I cannot in other terms address you, as the brother of my late dear and illustrious friend, Sir

Humphry Davy, I beg you to accept my sincere thanks for the invaluable testimony of his regard which you have transmitted to me, and for your interesting and obliging note accompanying it. I need not say how much I feel honoured by his kind recollection of me, and by his making that feeling known to the world; nor how sensible I am of your attention, by mentioning in the preface the affecting circumstances under which the dedication was written. I received the book last night. I have read it through with deep interest, and it will interest and instruct, and excite to noble purposes all who read it. It is delightful to see his mind partaking so much of heaven when just on its threshold.

“There is another gratification which I have experienced, to which I cannot help alluding; I mean my friend’s recollection of me by his will. I have received the legacy from Lady Davy, and have appropriated it to the purchase of his portrait by Howard. It is, I remember, a striking likeness of *what he was* seventeen years ago, and a good painting. I think myself very fortunate in being able to procure it. The picture is now on its way from London, and will be my companion while I live. Its presence will tend to make me wiser and better.

“I cannot conclude without expressing a hope, that when any circumstance takes you *to the West*, you will favour me with a visit. I am but eight miles of excellent road from Bridgewater; and it will give me great satisfaction to become acquainted with the brother of *the friend* whom I honoured and loved, and whose death, for my own sake and for the sake of mankind, I lament.

“I am, &c.

“THOMAS POOLE.”



In point of time, the next portrait which was painted of him was a full-length, by the late Sir Thomas Lawrence. It was commenced in 1810 or 1811. It is a good specimen of the manner of this distinguished artist, and was generally considered as an excellent likeness. Lady Davy has presented it to the Royal Society; and it is now suspended in the meeting-room of the Society, amongst the portraits of its illustrious Fellows.

The third portrait of him which I have to mention, was by Mr. Lonsdale, in the dress and chair of the President of the Royal Society. It was a picture which pleased me; rather ideal, indeed, but full of character, and, as I thought, a favourable likeness. I believe it was painted for his early friend, Mr. Thomson, of Clitheroe, in Lancashire, a gentleman fond of chemical pursuits and chemists; portraits of the most distinguished of whom he has collected at a considerable expense. The last I shall notice was a small picture, by Mr. Jackson, done about 1823, and also in the dress of President. It is now in the possession of Lady Davy. As a picture, for richness and harmony of colouring, it has merit, but I do not like it as a portrait: the likeness is not pleasing; it has not his best expression of countenance, and it is very deficient in a certain intellectual cast and aspiring look which belonged to him in his best moods of temper and thought. He, indeed, was a very difficult subject either for the pencil or chisel, and especially for the latter, owing to the mobility of his features, the varying expression of his eyes and mouth, and the impossibility of fixing, either on the canvass or marble, the evanescent lights of mental feeling which broke out in his countenance when animated in conversation on subjects of interest.

Bacon says, "The best part of beauty is that which no picture can express." The saying is most true in relation to him. None of his portraits, or, any bust of him, which I have seen, in my opinion, thoroughly did him justice, or conveyed a perfectly accurate idea of him. The engraving prefixed to this work, from a bust by Mr. Joseph, in my possession, is not an exception. The original model was made from the life in the year 1822, and since my brother's death, was retouched by the artist after my suggestions.

Of his character, generally, I shall introduce some notices by his contemporaries,—all of them unasked for by me,—and which have before appeared in print.

That distinguished man, the late Mr. Andrew Knight, who for many years was in the habit of meeting him in the circles of science as well as of fashion in the metropolis, and of receiving his visits in his own beautiful country retirement, thus speaks of him:

"My late lamented friend, Sir Humphry Davy, usually paid me a visit in the autumn, when he chiefly amused himself in angling for grayling, a fish which he appeared to take great pleasure in catching. He seemed to enjoy the repose and comparative solitude of this place, where he met but few persons, except those of our own family, for we usually saw but little company. He always assured me that he passed his visits agreeably, and I have reason to believe he expressed his real feelings. In the familiar conversations of those friendly visits, he always appeared to me to be a much more extraordinary being than even his writings and vast discoveries would have led me to suppose him; and in the extent of intellectual powers, I shall ever think that he lived and died without an equal."

The following is the late Mr. Poole's estimate of him,—who was his oldest and most attached friend:

“Although the most friendly intercourse existed between us for thirty years, and occasionally correspondence by letters, I fear I have little else to communicate than to bear testimony to his general intellectual elevation, and to the warmth, sincerity, and simplicity of his heart. I was first introduced to him at the Medical Pneumatic Institution at Clifton, in, I think, 1799, where I inhaled his nitrous oxide with the usual extraordinary and transitory sensations; but the interesting conversation, manners, and appearance of the youthful operator were not transitory; nay, riveted my attention, and we soon became friends.

“From that time to his death, no interruption of the most cordial good-will and affection occurred between us. Neither the importance of his discoveries, nor the attentions of the exalted in rank or science, whether as individuals or public bodies, nor the honour conferred on him by his sovereign, made the least alteration in his personal demeanour or in the tone of his correspondence. No man was ever less spoiled by the world. The truth is, though he conformed to the world, and paid due deference to those men and things which are deferred to by the world, his delight was in his intellectual being. He felt that he had the power of investigating the laws of nature beyond that entrusted to the generality of men; and the success with which he acted on this impulse increased his confidence. During his last visit to me, in November, 1827, when in a very weak state of health, he more than once said, ‘I do not wish to live, as far as I am personally concerned; but I have views which I could develope, if it please God to save my life, which would be useful to science and to



mankind.' Indeed, to be useful to science and to mankind was that in which he *gloried*, to use a favourite word of his. He was enthusiastically attached to science, and to men of science; and his heart yearned to be useful to mankind, and particularly to the humblest of mankind. How often have I heard him express the satisfaction which the discovery of the safety lamp gave him! 'I value it,' he said, 'more than anything I ever did: it was the result of a great deal of investigation and labour; but if my directions be attended to, it will save the lives of thousands of poor men.' 'I was never more affected,' he added, 'than by a written address which I received from the working colliers when I was in the North, thanking me on behalf of themselves and their families for the preservation of their lives.' I remember how delighted he was when he showed me a service of plate presented to him by those very men and their employers, as a testimony of their gratitude.

"However his circumstances or situation in society altered, his labours and zeal in the pursuit of science were throughout his life undiminished.\* Not many days before he had that attack of paralysis at Rome, from which he never recovered, he tells me in a letter

\* Sir James Mackintosh has happily said, "It is ascertained by experience, that all the masters of science and of art—that all those who have successfully pursued truth and knowledge—love them for their own sake, without regard to the generally imaginary dower of interest, or even to the dazzling crown which fame may place on their heads."—*Dissertation on the Progress of Ethical Philosophy*.

My brother, in his love of science, was an instance of this. Whatever his ambition might have been—and the feeling was as strong as it was lofty—his love of science was stronger; in proof of which I may state my belief that it outlived his ambition—"that last infirmity of noble minds"—or at least continued unimpaired, whilst the other was diminishing.

that he was employed in the investigation of the generation of eels. Natural history in general had been a favourite subject with him throughout his protracted illness; for when he was with me in November, 1827, he paid attention to that subject only; 'for,' said he, 'I am prohibited from applying, and am indeed incapable of applying, to anything that requires severe attention.' During the same visit I remember his inherent love of the laboratory (if I may so speak) was manifested in a manner which much interested me at the moment. On his visiting with me a gentleman in this neighbourhood who had offered to let him his house, and who has an extensive philosophical apparatus, particularly complete in electricity and chemistry, he was fatigued by the journey; and as we were walking round the house very languidly, a door opened, and we were in the laboratory. He threw his eyes round the room, which brightened in the action,—a glow came over his countenance, and he appeared himself twenty years ago. He was surprised and delighted, and seemed to say, 'This is the beloved theatre of my glory.' I said, 'You are pleased.' He shook his head, and smiled. What from my earliest knowledge of my admirable friend I considered his most striking characteristic was the quickness and truth of his apprehension. It was a power of reasoning so rapid when applied to any subject, that he could hardly himself be conscious of the process; and it must, I think, have been felt by him, as it appeared to me, pure intuition. I used to say to him, 'You understand me before I half understand myself. I recollect on our first acquaintance he knew little of the practice of agriculture. I was at that time a considerable farmer, and very fond of the occupation. During his visits in those days, I was at first

something like his teacher in this matter ; but my pupil soon became my master, both in theory and practice. No man was less a sectarian (if I may use the word), in religion, in politics, or in science. He regarded with benevolence the sincere convictions of any class on the subject of religion, however they might vary from his own. In politics he was the ardent friend of rational liberty ; he gloried in the institutions of his country, and was anxious to see them maintained in their purity, by timely and temperate reform. Men of science, wherever situated, he considered as fellow-subjects of one great republic, spread over the world. I was in London soon after he received the letter from France, announcing that the National Institute had awarded him the prize given by Napoleon to the greatest discovery by the means of galvanism. (These discoveries are detailed in the Transactions of the Royal Society, 1807.) He showed me the letter, and said, ‘Some people say I ought not to accept this, and there have been foolish paragraphs in the papers to that effect ; but if the two countries or governments are at war, the men of science are not,—that would indeed be a *civil war* of the worst sort.’—‘Rather,’ he added, ‘we should, through the instrumentality of men of science, soften the asperity of national war.’ Among my friend’s intellectual efforts, his poetical productions are worthy of attention. Some have been published ; and I believe there is a large collection in manuscript. If his mind had been given another direction, he probably would have ranked high among our poets. I recollect hearing perhaps the greatest living poetic genius\* say, ‘Had not Davy been the first chemist, he, probably, would have been the first poet of his age.’

\* The late Mr. Coleridge.



As to his amusements, he was latterly a good shot, and an expert angler,—a great admirer of old Isaac Walton. He highly prided himself on these accomplishments. I used to laugh at him, which he did not like; not that I under-rated them, but it amused me to see such a man give so much importance to these qualifications. He would say, ‘It is not the sport only (though there is a great pleasure in successful dexterity); but it is the ardour of the pursuit,—the pure air,—the contemplation of a fine country,—the exercise,—all which invigorate the body, and excite the mind to its best efforts.’\*

“He endeavoured, at different times, to purchase an estate in this neighbourhood, on which he proposed to reside occasionally ‘for the sake,’ he said, ‘of field sports in a fine country.’ These amusements seem to have become more and more important in his estimation as his health declined, and it was affecting to observe the efforts he made to share them as his strength diminished. From being able to walk without fatigue for many hours, he was, when he came to me, in November, 1826, obliged to have a pony to take him to the field, from which he dismounted only in the certainty of immediate sport. In the following year he could only take short occasional rides to the covers, with his dogs around him, and his servant walking by his side car-

\* One great charm and recommendation of field sports, especially of angling, ought always to be remembered,—the associations belonging to them, the freshening and soothing influence of the recollections of them on the mind when fatigued by study or the laborious business of action and professional life. Who that is fond of angling has not been refreshed wonderfully, and his mind lightened when oppressed by cares and toils by even dreaming of angling;—and I believe, that in sleep after such an oppressed state of the waking mind, there is a peculiar tendency to such refreshing dreams.

rying his gun, but which, I believe, he never fired. During this last visit (November and December, 1827) his bodily infirmity was very great, and his sensibility was painfully alive on every occasion. Unhappily he had to sustain the affliction of the sudden death of Mr. K., the son of a friend whom he highly valued\*; and though this afflicting event was by the considerate attention of Lady Davy first communicated to me, to be imparted to him, with every precaution to avoid his being suddenly shocked, yet it was many days before he could resume his usual spirits, feeble as they were, and wonted occupation. On his arrival, he said, ‘Here I am, the ruin of what I was!’ But, nevertheless, the same activity and ardour of mind continued, though directed to different objects.

“He employed himself three hours in the morning on his ‘*Salmonia*,’ which he was then writing. He would then take a short walk (which he accomplished with difficulty), or ride; and after dinner I used to read to him some amusing book. We were much interested particularly by Southey’s ‘*Life of Nelson*.’ ‘It would give Southey,’ he said, ‘great pleasure if he knew how much his narrative affected us. In the evening Mr. and Mrs. W. (he had long known W.) frequently came to make a rubber at whist. He was averse to seeing strangers; but on being shown the drawings in natural history of a friend of mine of great talent, Mr. Baker, of Bridgewater, he was anxious to see him, and was much pleased with his company, and suggested to him various matters for investigation concerning fish, particularly the eel. What pleasure would it give him if he were now alive, to learn the interesting result of these suggestions, which will, I hope, soon be known to the public!

\* Mr. Andrew Knight.

“I know not that I can add more to fulfil the object I proposed to myself, which was not to speak of Sir Humphry Davy’s discoveries in science, his various literary productions, or his able and upright conduct as a member of public bodies ; these are before the public, and evince his greatness : but it was to show that he was not only one of the greatest but one of the most benevolent and amiable of men.”

The next is the late Dr. Henry’s, relating chiefly to his intellectual character, compared with Dr. Wollaston ; the sketch was introduced into the Preface of his *Elements of Chemistry*, published shortly after their deaths.—After noticing qualities common to both,—habits of accurate reasoning,—unwearied industry and zeal in research ; “without which,” Dr. Henry very justly remarks, “even the energies of genius are inadequate to the achievement of great scientific designs.” He continues : “With these excellencies common to both, they were, nevertheless, distinguished by marked intellectual peculiarities. Bold, ardent and enthusiastic, Davy soared to loftier heights ; he commanded a wider horizon ; and his keen vision penetrated to its utmost boundaries. His imagination, in the highest degree fertile and inventive, took a rapid and extensive range in pursuit of conjectural analogies, which he submitted to close and patient comparison with known facts and tried by an appeal to ingenious and conclusive experiments. He was imbued with the spirit, and was a master of the practice, of the inductive logic ; and he has left us some of the noblest examples of the efficacy of that great instrument of human reason in the discovery of truth. He applied it, not only to connect classes of facts of more limited extent and importance but to develope great and comprehensive laws, which



embrace phenomena that are almost universal to the natural world. In explaining these laws, he cast upon them the illuminations of his own clear and vivid conceptions ;—he felt an intense admiration of the beauty, order and harmony which are conspicuous in the perfect chemistry of Nature ;—and he expressed these feelings with a force of eloquence which could issue only from a mind of the highest powers, and of the finest sensibilities.”

The next and last estimate of his character was quite independent of friendship, or even of personal acquaintance,—formed, as distinctly expressed, solely from his works, written in the United States, and published in Professor Silliman’s “American Journal of Science and Arts” for January, 1830 :—

“ We can hardly trace the progress of a man through life, whose actions were all great, and whose enterprises were all successful, without seeming to indulge too much in the spirit of eulogy ; but it is certainly true of here and there a mind, *Nihil tetigit, quod non ornavit*. We pretend not to know any thing of the private history of Sir Humphry Davy, but we have for a number of years contemplated his character through the medium of his works, and we are free to say that we regard it as constituted of a very universal assemblage of great and noble qualities, quickness of perception and “patient thought,”\* —inventive genius and strong reasoning powers—perseverance to complete what ingenuity has begun, and an eloquent tongue to utter what a profound and brilliant mind has conceived ; these qualities were all interwoven, in fine proportions, to form a bright and varied tissue. And, although we must not presume

\* The motto of Newton.

from his works alone, to make a complete analysis of his moral qualities, yet it is impossible not to recognise in his history, as derived from these sources, many incidental marks of an amiable temper and refined feelings, allied with heroic courage. Pursuits which have early engrossed the powers of genius, and opened its pathway to fame, sometimes create, artificially, a disrelish for other objects, and a tendency to undervalue their importance. But the personage we are contemplating was evidently incapable of any such exclusive feelings. The noble progeny of genius, or intellect, wherever found, a spirit like his would at once acknowledge as its kindred. Accordingly, his Discourses before the Royal Society exhibit striking proofs of liberal and generous feelings towards all the votaries of science.

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“ To conclude, we look upon Sir Humphry Davy as having afforded a striking example of what the Romans called *a man of good fortune* ;—whose success, even in their view, was not however the result of accident, but of ingenuity and wisdom to devise plans, and of skill and industry to bring them to a successful issue. He was fortunate in his theories, fortunate in his discoveries, and fortunate in living in an age sufficiently enlightened to appreciate his merits ;—unlike, in this last particular, to Newton, who (says Voltaire), although he lived forty years after the publication of the *Principia*, had not, at the time of his death, twenty readers out of Britain. Some might even entertain the apprehension that so extensive a popularity among his contemporaries, is the presage of a short-lived fame ; but his reputation is too intimately associated with the eternal laws of Nature to suffer decay ; and the name of Davy, like those of Archimedes, Galileo and New-

ton, which grow greener by time, will descend to the latest posterity."

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I have now brought this work to a conclusion. It has been said by Mr. Babbage, in his "Essay on the Decline of Science in England," that we can expect eulogy only, not biography, from contemporary writers. His words are, (referring to Dr. Wollaston and my brother, then recently dead,) "Until the warm feelings of surviving kindred and admiring friends shall be cold as the grave, from which remembrance vainly recalls their cherished forms invested with all the life and energy of recent existence, the volumes of their biography must be sealed; their contemporaries can expect only to read their *éloge*." This opinion, it appears to me, is neither consistent with experience, nor indeed accordant with Mr. Babbage's own sentiments as expressed in the preface to his book, in which he approves of the judgment "that the famous maxim 'de mortuis nihil nisi bonum,' appears to savour more of female weakness than of manly reason." And that it is not consistent with experience, have we not too many accumulated proofs? Men at all times must necessarily write (supposing they are honest, and not under the influence of an unworthy bias) as they think and feel; and consequently contemporary biography will be either indulgent and laudatory, or severe and censorious, according to the feelings and sentiments existing in the minds of the writers respecting the individual they describe. Compare, for instance, the notices of Milton by some of his contemporaries in his old age:—

"Fall'n on evil days and evil tongues  
In darkness and with dangers compass'd round."—



Compare those bitter and reviling notices, eternally disgracing the writers of them (should their disgrace, Judas-like, perpetuate their memories), with the free-will and noble eulogies of after times :\* or consult a Life of Luther or of Calvin, written by a Roman Catholic a few years after their decease, and another by a Protestant of the same period,—how totally different are the men represented ! †

These are extreme cases ; but in all other instances the motives are more or less similar, and the effect must correspond. The maxim “*de mortuis nil nisi bonum*,”

\* Take for example Winstanley’s notice of our great poet, in the “*Lives of English Poets*,” published in 1686, twelve years after Milton’s death, when the press was under a censor and “*licensed*.” After naming John Milton, with commendation, as the author of *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*, the biographer adds in language worthy of his sentiments—“*But his fame is gone out like a candle in a snuff, and his memory will always stink, which might have ever lived in honourable repute had not he been a notorious traitor, and most impiously and villanously bely’d that blessed martyr, King Charles the First.*” And (strange inconsistency) this writer’s motto was

“*Marmora Mœonii vincunt monumenta Libelli ;  
Vicitur ingenio, cætera mortis erunt.*”

Well might our great poet declare—

“*Fame, if not double-fac’d, is double-mouth’d,  
And with contrary blast proclaims most deeds :  
On both his wings, one black, the other white,  
Bears greatest names in his wild æry flight.*”

† Beza, the admiring biographer of Calvin, thus concludes the history of his life, perfectly in accordance with the above remark : “*Ego historiam vitæ et obitus ipsius, cujus spectator sedecim annos fui, bonâ fide persecutus, testari mihi optimo jure posse videor, longe pulcherrimum veræ Christianæ tum vitæ, tum mortis exemplum in hoc homine cunctis propositum fuisse, quod tam facile sit calumniari, quam difficile fuerit æmulari.*” (*Joan. Calvini vita à Theod. Beza, Genevensis Ecclesiæ Ministro accurate Descripta. Hanoviæ, 1597.*)

is, as it were, the generous sense of mankind on the manner in which the dead ought to be treated, and intended as a check on slander. Like everything else which is good, this maxim may be abused, especially when it produces merely "vague reports and barren eulogies."\* That a man is not free from human infirmities must always be taken for granted. To hold up the infirmities of a man of genius to observation is neither necessary nor useful; on the contrary, injurious, as tending to lower him as an example in the minds of posterity, and diminish the influence of his name. Almost from the nature of biography, it appears to me that it *ought* to be laudatory. Who is competent to write the life of a contemporary, but one intimately acquainted with him? And who would undertake the labour from any but mercenary or other improper motives, excepting an admirer of him,—excepting, in brief, a friend? It is only the friend who is competent to the task; he who has enjoyed his intimacy and confidence; who knows not only his actions, but his views and principles; and has, as it were, had the advantage of being behind the scenes (so far as one human being can be to another) of the stage of life. My situation in relation to my brother, I am happy and proud to confess has been very much this; otherwise I would not have attempted the present work. The faults of a friend, the trifling faults,—those which are passed over in the estimate of living character, and which it would be difficult to record in friendly biography,—are like the shades of a picture, not detracting from, but heightening the whole. As shades, no one can duly appreciate their effect but he who is a thorough master of the subject, and to whom they may appear not the least admirable

\* Bacon.

part of the painting; and so, perhaps, I am sometimes disposed to think (and it may be charitable to adopt the conclusion), that in human life what is considered as a shade (provided it is free from moral taint) may to superior intelligences appear rather as an excellence than defect, derived from some high principle, the detection of which has escaped common observation, and which in the individual character has been productive of good.

One more tribute from a friend (now no more) I cannot refrain from having the satisfaction of inserting, more especially as he was acquainted with my brother almost as long as Mr. Poole; and being resident in London, and in the same circle of society, was always on terms of intimacy with him. I allude to the late Mr. Sotheby. In a little poem of his, written in 1833, in compliment to the living men of science of the time, he thus apostrophises his friend; I give only a part, that relating to his mind:—

“Thou! from whose lip the word that freely flowed  
With all a poet's inspiration glowed,  
Lamented friend, farewell! Thou liest at rest,  
A world of wonders buried in thy breast!  
High aims were thine,—all nature to explore,  
Make each new truth developed gender more,  
And upward traced through universal laws  
Ascend in spirit to the Eternal Cause.  
Such was thy ardent hope, thy view sublime.  
But ah! cut off in manhood's daring prime,  
Thou liest where genius leans upon thy tomb,  
And, half eclipsed, mourns thy untimely doom.”\*

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\* Lines suggested by the third meeting of the British Association for the Advancement of Science, held at Cambridge in June, 1833. By the late W. Sotheby, Esq., F.R.S.



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### ERRATA.

- Page 126 line 1. *insert to after regret.*  
5. *for consideration read considerations.*  
144 — 25. *after with omit the.*  
186 — 2. *for couch read conch.*  
224 — 9. *for it is easy read it is as easy.*  
251 — 31. *for Lusignana read Lusignano.*  
291 — 25. *for Sir Edward read Sir Edmund.*  
381 — 20. *after think omit it.*  
432 — 18. *for Societies read Society.*





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